Owner's Manual Version 2.0

HYDRASYNTH

Deluxe

Polytouch®

ASM

ASM HYDRASYNTH

Deluxe

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The product and its software, when used in combination with an amplifier, headphones or speakers, may be able to produce sound levels that could cause permanent hearing loss. DO NOT operate for long periods of time at a high level or at a level that is uncomfortable.

If you encounter any hearing loss or ringing in the ears, please consult an audiologist.

Precautions Include, but Are Not Limited to, the Following:

1. Read and understand all the instructions.
2. Always follow the instructions on the instrument.
3. Before cleaning the device, always remove the USB and DC cable. When cleaning, use a soft and dry cloth. Do not use gasoline, alcohol, acetone, turpentine or any other organic solutions; do not use a liquid cleaner, spray or cloth that's too wet.
4. Do not use the device near water or moisture, such as a bathtub, sink, swimming pool or similar place.
5. Do not place the device in an unstable position where it might accidentally fall over.
6. Do not place heavy objects on the device. Do not block openings or vents of the device; these locations are used for air circulation to prevent the device from overheating. Do not place the device near a heat vent at any location with poor air circulation.
7. Do not open or insert anything into the device that may cause a fire or electrical shock.
8. Do not spill any kind of liquid onto the device.
9. Always take the device to a qualified service center. You will invalidate your warranty if you open and remove the cover, and improper assembly may cause electrical shock or other malfunctions.
10. Do not use the device with thunder and lightning present; it may cause electrical shock.
11. Do not expose the device to hot sunlight.
12. Do not use the device when there is a gas leak nearby.
13. Ashun Sound Machines is not responsible for any damage or data loss caused by improper operation of the device.

Specifications Subject to Change

The information contained in this manual is believed to be correct at the time of printing. However, Ashun Sound Machines reserves the right to change or modify any of the specifications without notice or obligation to update the hardware that has been purchased.

Before Requesting Service...

Please study this manual carefully and consult your dealer before requesting service. Service charges incurred due to a lack of knowledge relating to how a function or feature works (when the product is operating as designed) are not covered by the manufacturer's warranty, and are therefore the owner's responsibility.

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Everyone at Ashun Sound Machines would like to thank you for choosing one of our Hydrasynth instruments. We're very proud of what we have created, and are confident they will take you into musical realms that have never been explored.

Every aspect of these ground-breaking devices has been carefully considered, from the way the sounds are generated and processed, to the intuitive layout of the controls and displays. Everything from impulse to performance has been optimized to unleash the creative potential of these instruments in your hands.

Main Features

This chapter will only list the main features of the Hydrasynth Deluxe. But there are many more, and each feature and its related parameters will be described in the pages ahead. Advanced users might find quick answers to important questions in *Deluxe Specifications (p. 126)*.

User interface

- Intuitive workflow, perceived at a glance
- Top-panel controls for instant access to important features
- Easy shortcuts for patch / mod route construction (connect / copy / paste)
- Two independent OLED displays
- 8 Control knobs and 8 Control buttons around the Right display
- LED rings around the Control knobs indicate parameter values
- 8 assignable Macros per patch, accessible on Home page
- Arpeggiator: 8 modes with direction, octave, chord, and phrase options
- Browse Multi or Single patches by Name, Category, or Number
- Memorize / instantly recall up to 128 Favorites (shared by Multis and Singles)
- Overflow mode can link two units for up to 32-voice polyphony (Single mode only)
- Switch instantly between Single / Multi modes with dedicated buttons

Patch features

- 8 banks of 128 patches each (Single mode)
- Mono and Unison voice modes, with unison detune
- Glide and glissando with programmable time, curve, trigger mode
- Mod Matrix with 32 routes per patch
- Programmable Analog Feel emulates the behavior of analog circuits
- Randomize function for individual modules, a single patch, or an entire Multi
- Use Single mode patches in a Multi, then edit / store them without changing the original patch
- 5 banks of 128 Multis
- Each Multi holds two independent patches (i.e., parts) for an additional 1,280 patches
- Edit Upper/Lower part parameters together or independently
- Dual or KeySplit modes
  - Independent octave ranges and levels for Upper and Lower parts
  - Sustain pedal, wheels, and ribbon can control Upper, Lower, or Both
  - Dual arpeggiators can be synced or shared by Upper/Lower parts
  - Macros can control Upper, Lower, or Both; access up to 16 Macros per Multi
  - Dual mode: Definable velocity switch point with adjustable crossfade
  - KeySplit mode: Definable keyboard split point with adjustable crossfade
- Dedicated Multi section, with Upper/Lower selection buttons and Balance control

Sound engine

- 16 voices, with three oscillators per voice
    - Dual/KeySplit modes: layer or split two independent 8-voice patches
    - Single mode: One 16-voice patch
- Analog modeling (Osc 1-3) and WaveScan synthesis (Osc 1+2)
- Select from hundreds of waveforms and then morph / mutate / warp them at will
- Preset scales with microtonal options and the ability to import custom scales
- Filter 1: 16 filter types, including vocal formant filters
- Filter 2: classic state-variable 12dB / octave with two modes
- Filters can be placed in series or parallel
- Loopable ADSR envelopes with Delay and Hold stages
- Curve and BPM value for each segment
- Each envelope can have up to 4 trigger sources

Effects

- Delay: five types, including Left-Right-Center and reverse
    - All delays can sync to tempo
- Reverb: four types, with pre-delay and damping parameters
    - Reverb lengths to 90 seconds, plus "Freeze"
- Independent Pre/Post FX: Chorus, Flanger, Rotary, Phaser, Lo-Fi, Tremolo, EQ, Compressor, Distortion
- Global bypass of any or all FX modules
- Effects can be independent or shared between Upper/Lower parts in Multi Layer mode

Hardware

- 73-key Polytouch® keyboard with polyphonic aftertouch and velocity sensitivity (note on/off)
- Ribbon controller with Pitch bend, Theremin, and Modulation modes
- Backlit pitch bend and modulation wheels
- Octave Down / Up buttons
- Chord mode with dedicated button
- Glide button
- MIDI In/Out/Thru
- USB type B port, class-compliant
- CV/Gate inputs and outputs for integration with modular synthesizers
- Four 1/4" outputs (balanced): Main/Upper L/R, Lower L/R (automatic routing)
- Two headphone jacks share a dedicated Volume control
- Sustain pedal input (polarity-sensing)
- Assignable Expression pedal input (reversible)
- LED Brightness controls for darkened rooms
- Kensington lock port
- Detachable laptop shelf

Inside the Box

Your Hydrasynth Deluxe was carefully packed at the factory with the following items:

- The Hydrasynth Deluxe
- This manual
- The power supply (12VDC / ≥2A)
- Laptop shelf

Save Your Receipt!

Ashun Sound Machines designed and constructed your Hydrasynth Deluxe with extreme attention to detail. Our quality assurance personnel test each unit thoroughly before it goes out.

But in the unlikely event of a hardware problem, you will need to present your original receipt in order to obtain warranty service. This will help the service center to confirm your warranty coverage. So please be sure to save your receipt in a safe location!

Plug It In

Power

Use only the DC power supply that was in the box with your Hydrasynth Deluxe (12 Volts DC, ≥2 Amp). Make sure the power switch is in the OFF position before making this connection.

Before switching the unit on, please lower the volume of your speakers or mute the input channels on your mixer. This will help prevent any damage to your speakers or ears.

Audio

Using a mixer or audio interface

After muting the channel inputs or lowering the volume of your speakers, connect a pair of 1/4" cables from the Main L/R output jacks on the rear panel of the Hydrasynth Deluxe to the inputs of your mixer or audio interface. Then set the Hydrasynth Deluxe power switch to the ON position.

Note: The USB connection is not an audio output.

Using headphones

If you plan to connect headphones to the Phone jack on the Hydrasynth Deluxe, turn the unit on first and then connect the headphones. The Hydrasynth Deluxe has an independent level control for the headphones next to the connection jacks.

Master Volume control

The Master Volume knob controls all four Hydrasynth Deluxe outputs (Main/Upper and Lower). It's an analog control, which means it does not communicate its position or movements digitally via USB or MIDI.

But Master Volume does respond to MIDI CC #7 via USB and MIDI. So if you are using the Hydrasynth Deluxe with a computer, for example, remember that you'll need to adjust its level using a MIDI track in your DAW.

The Balance control also affects the Upper/Lower part levels in Multi mode when all four outputs are connected. More about all of this later!

USB

Hydrasynth Deluxe is a USB class-compliant device, so there are no drivers to install. Just plug it into your computer and it will be available immediately as a MIDI input/output device.

MIDI

The Hydrasynth Deluxe has three 5-pin MIDI connectors to allow you to interface with other MIDI devices. MIDI Out sends data from the Hydrasynth Deluxe, MIDI In receives data, and MIDI Thru passes data from the MIDI In *without* data from the Hydrasynth Deluxe.

CV/Gate

Your Hydrasynth Deluxe has a row of connectors that are used to interface with modular synthesizers. Each one can be configured to match the voltages and signal types of the most popular formats. For details, see *The CV / Gate Section (p. 94)*.

Laptop shelf

The included laptop shelf is designed for easy installation and immediate use. See *Rear Panel (p. 23)* in the Overview chapter for installation instructions.

Make Some Noise!

By now you've already played the instrument and tweaked the controls. Now let's take a quick tour of some of the main features.

To get started, press the [SINGLE] button (under the Master Volume knob). This will exit any page and take the Hydrasynth Deluxe to the top level of the current Single mode patch. We'll explore Multi mode later.

You can always use the Home button to jump to the top level of the current mode (Single or Multi).

Select Patches

There are several ways to explore the patch banks in Single mode. The simplest way is to turn the Patch knob (the big one in the middle), or use the left and right arrow buttons above the Home button. This will move you through the bank one patch at a time. You'll see the patch name, bank, and number in the Left display.

You can also hold [SHIFT] and turn the Patch knob to jump between the banks. This can save a lot of scrolling if you know the location of the patch you're looking for.

The Browse button opens the patch browser in the Right display. You'll want to read the section *Using the Browser (p. 97)* to learn about things like Categories, Favorites, and other search techniques.

Octave shift

If you want to hear a sound in a higher or lower range than the keys currently reach, you can shift the range quickly by one or more octaves. The Hydrasynth Deluxe has dedicated buttons above the wheels that flash faster as the range moves further from center; at maximum shift the buttons are lit solid. To reset the range, press both buttons.

Arpeggiator basics

Arpeggiators can turn a great sound into a whole performance! So when you're ready, press the Arpeggiator [ON] button to activate the arpeggiator. Then hold down two or more keys while experimenting with the other controls in the Arpeggiator section. Here's a quick description of each.

Control	Function
Tempo	Turn this to adjust the tempo, or use the Tap Tempo button.
Ratchet	Sets how many subdivisions of an arpeggiator step are possible (1, 2, 4, or 8).
Chance	Determines the likelihood of a Ratchet event happening on a given arpeggiator step.
Gate	Adjusts the relative duration of the arpeggiator notes.
Mode	Determines the arpeggiator direction and other behaviors.
Octave	Sets the range of the arpeggiator.
Division	Selects the basic time division of the arpeggiator relative to the tempo.
Swing	Eight settings allow you to add a certain amount of "shuffle feel" to the arpeggio.
On	This toggles the arpeggiator on and off. Use it with [SHIFT] to enter Edit mode.
Latch	Lets you to take your fingers off the keys and use both hands to adjust parameters. It works whether an arpeggio is running or not.
Triplet	Subdivides the selected Division setting into triplets.
Tap Tempo	Tap several times to set the tempo.

There are words in orange letters under two of the buttons: EDIT and SUSTAIN. These are used with the [SHIFT] button to access their secondary functions. We'll describe those and the other arpeggiator features in *The Arpeggiator Section (p. 82)*.

Tweaking the sounds

The Right display provides information about what is happening and what the options are, no matter what you're doing with the Hydrasynth Deluxe. We'll dig down into every parameter eventually, but for now let's start at the top again. If you're still in Single mode, press [HOME] to exit to the Home page. If you've ventured into Multi mode, please press the [SINGLE] button to make sure you're seeing what we're describing.

The Home page: Macro City

When Hydrasynth Deluxe is on the Home page the Control knobs and Control buttons become modulation sources for the Macros. Each Macro can alter as many as eight parameters at one time by activating a single control. Every Single mode patch has eight Macros available, so a Multi can provide as many as 16 Macros.

Macros allow you to achieve complex results, but they're easy to create. When you're ready to try that, see *Mastering the Macros (p. 86)*.

The rest of the Master Control section has buttons that will be useful in the near future. They will be covered in *Master Control Section (p. 19)*.

The Filter section

This section has two buttons and five knobs. The buttons select which of the two filters the knobs will control, after which the knobs can do their thing.

Knobs 1 and 2 are the same for either filter: they control Cutoff and Resonance, respectively. If Filter 1 is selected the third knob controls the Drive amount for that filter; if Filter 2 is selected the third knob allows you to "morph" the characteristics of that filter.

Those descriptions barely scratch the surface, though. To delve more deeply into what the Hydrasynth Deluxe filters can do, read *The Filters and their Controls (p. 51)*.

Saving

In the process of tweaking a sound you will often create something you'd like to keep. If that has already happened, jump ahead to the Patch Management chapter and follow the instructions in *Save the Patch (p. 99)*.

Check for Updates

Be sure to visit *www.AshunSoundMachines.com* soon, and often! It's your source for important things such as:

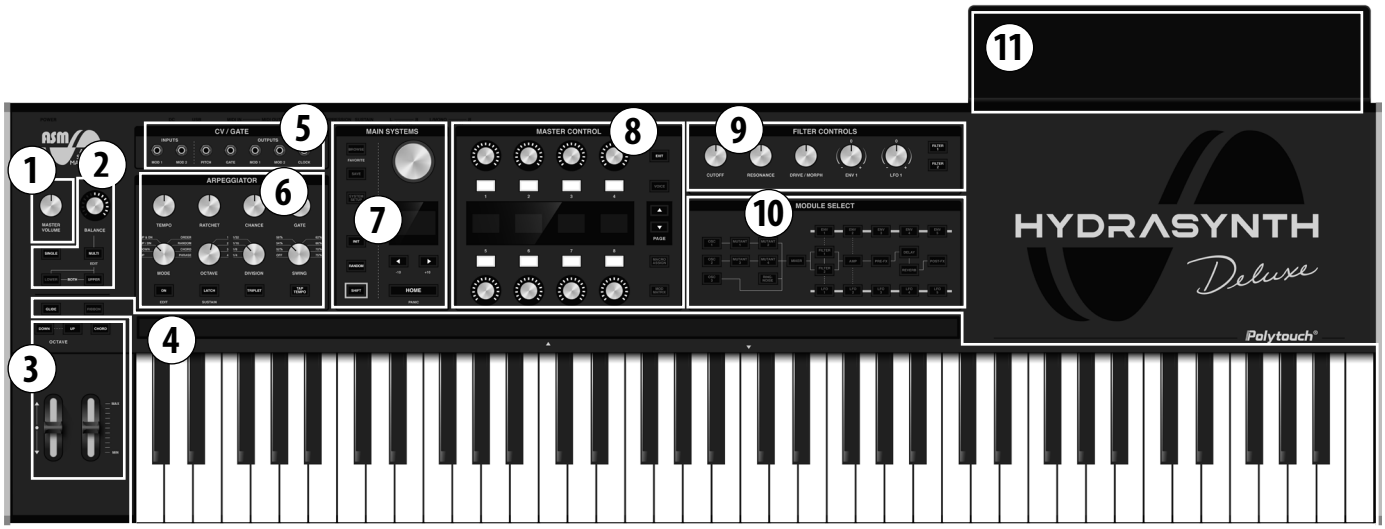
- Firmware updates for your Hydrasynth Deluxe
- An interactive version of this manual
- Banks of new patches from our top-notch sound design team
- Tutorial videos to help you master the intricacies of the Hydrasynth Deluxe
- The original factory banks
- Our free patch librarian, Hydrasynth Manager
- ...and more!

That's Enough Reading for Now.

We've covered the basics. Now let your creativity go wild!

The Hydrasynth Deluxe represents a perfect balance of instant access, intuitive workflow, powerful features, and great sound, all with a single aim: to make the creation and performance of mind-blowing music easier and more fun.

Top Panel: Hydrasynth Deluxe



Section	Name	Section	Name
1	Master Volume	6	Arpeggiator section
2	Single mode button	7	Main Systems section
	Multi mode controls	8	Master Control section
3	Wheels, Octave / Chord buttons	9	Filter Controls section
4	Keyboard, Ribbon, Ribbon / Glide buttons	10	Module Select section
5	CV / Gate connectors	11	Laptop shelf (installed)

General Concepts

Access buttons

The Access buttons are located in several areas of the top panel. Their letters can be different colors, depending on the top panel status. All of the buttons in the Module Select section and many of those in the Main Systems and Master Control sections are Access buttons. Their purpose:

- Press an Access button and the main parameter page for that feature appears in the Right display for editing.
- If more pages exist, one or both Page buttons will point to the other pages.
- Pressing an Access button repeatedly will also scroll through its pages.

Function buttons

These are the white-lettered buttons, and they make instant changes (load a patch, switch filters, toggle something, activate a Macro, etc.). It might help to remember that

- buttons with colored letters **select** things and
- buttons with white letters **do** things.

For example: To enable the Arpeggiator, press the [ON] button. To exit any page, press [EXIT] or [HOME].

Mode Select Controls

The Single/Multi buttons select those modes. In Single mode the Multi controls are inactive. In Multi mode the Upper/Lower buttons and the Balance knob are active. The modes are explained in *Multi Mode (p. 25)*.

Part Select buttons

The Part Select buttons are used in Multi mode to specify whether the Upper or Lower part is active on the top panel. Their letters default to yellow and blue, respectively, and the color of the top panel changes when they are pressed. We'll learn more about these buttons in *Multi Mode (p. 25).*

Control knobs

Above and below the Right display are two sets of four knobs. They are "endless encoders": parameters are edited from their current value, rather than jumping to another value that was based on the position of the knob.

The Control knobs play different roles depending on the page that has been accessed:

- On the Home page they become Macro controls.
- On a parameter page they are used to adjust parameter values.
- In Multi mode the Control knobs will edit parameters for the Upper part, the Lower part, or Both, depending on the top panel status. The top panel color scheme indicates which parameters are active.

Control buttons

Each Control knob is paired with a Control button. Their function also depends on the page that has been accessed.

- On the Home page they can affect a Macro in one of four ways (Toggle, Trigger, Switch, or Reset). This choice is made on System Setup *Master: Page 2 (p. 102)*.
- On a parameter page they are used to:
  - select a parameter value for editing
  - toggle a value (Oscillator Solo on/off, for example), or
  - enter a lower-level editing page (i.e., Wavelist Edit for a WaveScan oscillator).

Module Select buttons

These buttons access the parameter pages of the selected Module (Osc 1, Delay, LFO 5, etc.) The signal path generally moves from left to right, but vertical lines between two buttons indicate:

- a pre-wired connection (Env 1 / LFO 1 to Filters, Env 2 / LFO 2 to Amp), or
- the ability to be routed in Series or Parallel, as with the Filters, or
- order of operations, such as the output of the Delay is fed to the input of the Reverb.

The Module Select buttons can be used as a quick way to set up a Mod Matrix route, too (hold one, press another). For information about that, see *The Mod Matrix (p. 90)*.

Knob types

Variable knobs

Two types of variable knobs are used:

- 270° encoders: The range has an upper and lower limit. Examples: Master Volume, Filter Cutoff
- Endless encoders: These have no range limits, so an edit always starts from the current value.

Selection knobs

These are only found on the bottom row of the Arpeggiator section. A "selection knob" clicks between positions to select a value. Of these four, only the Swing parameter can be set to intermediate values (see *Swing (p. 82)*.

The displays

At the center of it all are two high-resolution OLED displays, also known as the Left display and the Right display. They serve different purposes:

- The Left display is for Patch selection and helpful graphics.
- The Right display is for parameter selection and adjustment.

When an Access button is pressed, the Right display and its surrounding controls change functions to allow instant access to the most-used parameters. The Page up/down buttons put all other parameters within easy reach.

Main Systems

Patch selection

One of the major functions of this section is patch selection. There are several methods, and you might use them all at different times depending on what you're doing.

Patch knob

From the Home page you can select an adjacent patch by turning the Patch knob a single click in either direction. You can also jump between the banks if you hold [SHIFT] while turning the knob.

Left / Right arrows

As with the Patch knob, press one of these buttons to select an adjacent patch. Hold [SHIFT] first to make the buttons jump through the patches 10 at a time.

Browse

This page lets you alter the way the patches are presented in each bank. There are three different sort orders: By Patch #, by Name, or by Category.

The Browse page also contains a robust Compare feature, as well as a sub-menu where you can designate a Multi or Single patch as a Favorite. You can stash up to 128 of these in a Favorites bank for instant access.

For details on each of these functions, see *Using the Browser (p. 97)*.

Favorites (Shift + Browse)

When you need to find your best sounds immediately you can jump straight to your Favorites bank from any other page.

- Hold [SHIFT] and press [BROWSE] to access your Favorites
- Use the Page Down/Up arrows to move between the 16 banks of Favorites
- Press the Control button next to the patch name to select it.

The HOME button

The Home button is located at the bottom of the Main Systems section. It provides a quick way to get back to the top level of Single or Multi mode, where the Macro controls are. This is known as the Home page in either mode.

All Notes Off

Sometimes MIDI signals are disrupted and a note becomes stuck. If that happens, hold [SHIFT] and press [HOME] to transmit an "All Notes Off" command. This will silence any stuck notes.

The SAVE button

Whenever you've made an edit that you'd hate to lose, press [SAVE] to access the Save page. You'll be able to select a new location for the edited patch, rename it, and assign it to a category (Bass, Pad, etc.). You can even decide which color the Patch knob and wheels will be when the patch is selected.

There's another feature that determines whether the positions of the Macro knobs will be stored as-is, returned to zero, or saved as edits to the parameters they control.

For details, see *Save the Patch (p. 99)*.

System Setup

This section has 13 pages. It holds all of the global settings for the keyboard, the knobs, the pedals, the CV / Gate section, etc.

[SAVE] and [SYSTEM SETUP] are used together to specify the boot-up patch for the Hydrasynth Deluxe.

For details about each page, see *The System Setup Pages (p. 101)*.

The INIT button

Reset a parameter

The INIT button will reset any parameter to its default value: just hold [INIT] and press the Control button next to that parameter's value. The Control button will light up next to any parameter that has been edited, which helps you know which one to press.

Initialize a Module

You can reset the parameters for an entire Module using a similar method:

- Hold [INIT].
- Press the Access button for the desired module.
- Confirm the decision by pressing [INIT] again.
- If you decide not the initialize, press [EXIT] to cancel the procedure.

Initialize a Patch

If you want to build an entire patch from scratch, press [INIT] twice in a row. This will erase the contents of the Edit buffer, so be sure to save any edits you don't want to lose.

The RANDOM button

If you're the adventurous type, you will love this button! It can randomize the value of any parameter, any module, a single patch, or even an entire Multi.

Randomize a parameter

To randomize a single parameter, hold [RANDOM] and press the Control button next to that parameter's value. The Control button of every available parameter will light up, so you'll know which ones **not** to press (the dark ones won't do anything).

Randomize a Module

You can randomize the parameters for an entire Module using a similar method:

- Hold [RANDOM].
- Press the Access button for the desired module.
- Confirm the decision by pressing [RANDOM] again.
- If you decide not the randomize, press [EXIT] to cancel the procedure.

Random Patch generation

You can even randomize an entire patch in Single or Multi mode, including the Effects! Sometimes the results are strange, but that's okay; just try it again. Once you get something interesting, you can save it like that or tweak it as needed.

In Single mode there are two ways to randomize the patch:

- Press [RANDOM] twice. The Left display shows "GENERATE" after the first press, and after the second press a random selection of values is generated.
- Hold [SHIFT] and press [RANDOM] twice. The Left display shows "PATCHRND" after the first press, and after the second press a random selection of values is pulled from other patches.

In Multi mode you can randomize an entire Multi, randomize only the Upper or Lower part inside the Multi, or randomize any module inside one of the parts as you would do in Single mode.

There are several ways to do this. But to summarize, you can either

- Select [Upper] or [Lower] and then press [RANDOM], or
- Hold [RANDOM] and then press [Upper] or [Lower].

Either way the results are the same: the selected item will be randomized.

But we left [Multi] out of the examples above, because those are different operations which provide very different results.

- If you select [Multi] and press [RANDOM] twice:
  the parts inside the Multi are randomized, but the Multi settings are not: Mode, balance, octave ranges, Arp setting, and controller settings are untouched.
- If you hold [RANDOM], press [Multi], and press [RANDOM] again:
  the settings of the Multi are randomized

but the parts inside the Multi are not. So the Upper/Lower sounds remain the same, but the MultiMode, split points, balance, octave ranges, Arp setting, and controller settings will be randomized.

Percent of Randomization

The Random feature can specify how much randomization happens in each module. Press [RANDOM] and use these two Pages to set the randomization limits for each.

Page	Modules	Range
1	OSC 1-3, Mutant 1-4, Mixer, Filters, Macro, ModMtrx, ENV, LFO	0-100%
2	Voice, Amp, FX, Arp, Ribbon	0-100%

Note: a limited Range means the randomization selects from a smaller range of values when you randomize a specific parameter (e.g., the OSC Wave).

Random Patch selection

Hydrasynth Deluxe can select a patch for you:

- Hold [RANDOM] and press one of the Left/Right arrows.
- Confirm the procedure by pressing [RANDOM] again, or press [EXIT] to cancel the process.

The SHIFT button

The Shift button is used in combination with various buttons and knobs to access secondary functions. When these are available the secondary functions are indicated with a row of orange text under the control.

In some cases [SHIFT] is used to accelerate value selection. For example, if you hold [SHIFT] and turn the Patch knob you can jump between Patch banks, as opposed to the standard operation of +/- 1 patch.

You can also use [SHIFT] to help fine-tune a value that has a large range. For example, if you want to set a precise value for filter resonance, hold [SHIFT] and turn the appropriate Control knob.

For a complete list of the available Shift functions, see *Control Combinations (p. 113)*.

Master Control Section

If you like to make your own patches, you might enjoy this top-panel section the most. When a Module is accessed the parameter values are shown in the Right display, selected with the Control buttons, and adjusted with the Control knobs. In Multi mode these edit the Upper part, the Lower part, or Both, depending on the top panel status. The Access button colors tell you which parts are active.

The Page Up/Down buttons provide access to more parameters whenever a Module offers more than eight. We'll describe the parameters of each Module in *Understanding the Modules (p. 38)*.

The Master Control section is also a lot of fun when you're on the Home page, thanks to the powerful Macro controls. For live performance or on-the-spot creativity, the Macros can kick everything into high gear. See *Mastering the Macros (p. 86).*

EXIT button

This button will light as soon as you enter any page. It will take you back to the previous page, and it can cancel a process if you decide not to do something (Initialize, Randomize, Save, etc.). The Home page is the only page where [EXIT] is not lit, because that's the top level of the patch.

VOICE button

This Access button takes you to a set of features that affect an entire Single mode patch, or the parts in Multi mode: Pitch bend range, Vibrato settings, Mono/Poly/Unison voice modes, and the Glide settings. This is also where the Scale is defined for each.

Perhaps more subtle but equally important, the Voice module is also home to the Analog Feel and Random Phase settings. These can really bring a patch to life.

For more information see *The Voice Module (p. 73)* chapter.

PAGE Up / Down buttons

These two buttons are lit if the selected module has more than one page. If one of those buttons is lit that means there are pages available in that direction. If both are lit then pages are available in both directions. If neither is lit, there are no additional pages to select.

Access buttons can be used to flip between pages too, which works great if there are only a few pages. But if the module has a lot of pages and the parameter you want is more than a few pages away, hold [SHIFT] and press one of the lit arrows to jump to the first or last page. Then use the Page Up/Down buttons to reach the desired page.

MACRO ASSIGN button

This Access button opens a page that is like a hallway with eight doors, and behind each one is a lab that makes a powerful performance control called a Macro. You can define up to eight modulation routes for each Macro, and then use the Control knobs and Control buttons to manipulate the Macros from the Home page. Each patch has its own set of 8 Macros, so a Multi controls as many as 16 (2 per Control knob).

To learn more about what's on the other side of those doors, see the chapter *Mastering the Macros (p. 86)*.

MOD MATRIX button

The Mod Matrix button reveals a digital patch bay that provides up to 32 sets of modulation routes per patch or layer. These are in addition to the Macros, although they can be controlled by them (and vice versa).

- Potential sources for the mod routes include LFOs, Envelopes, Aftertouch (both kinds), MPE (*three* kinds), plus the Ribbon, Expression pedal, CV inputs, and any MIDI CC # (Continuous Control number). We didn't list them all. Really.
- Destinations can be almost any Hydrasynth Deluxe parameter, including any Mod Matrix route. Additional destinations include the Macros, the Mod 1 and Mod 2 CV outputs, and any MIDI CC #.

There's a lot to say about this topic, so you'll want to read *The Mod Matrix (p. 90)*.

CV/Gate Section

These seven connectors allow the Hydrasynth Deluxe to interface with the wild and wonderful world of modular synthesizers. There are five outputs (Pitch, Gate, Mod 1, Mod 2, and Clock) and two inputs (Mod 1 and Mod 2).

The outputs send voltages and signals that can control external devices, and the inputs receive voltages that allow external devices to control parameters inside the Hydrasynth Deluxe.

The range of each voltage and what type of signals are sent are defined in *The System Setup Pages (p. 101)*, and information about how to use them is in *The CV / Gate Section (p. 94)*.

Arpeggiator Section

The Hydrasynth Deluxe provides an exciting set of arpeggiator features that you can enjoy immediately.

If you're in Multi mode you might enjoy them twice as much! This is because each layer has its own arpeggiator, and they can work separately or together.

If you'd like more information, there's a chapter dedicated to the ins and outs (or "ups and downs", if you will) of *The Arpeggiator Section (p. 82)*.

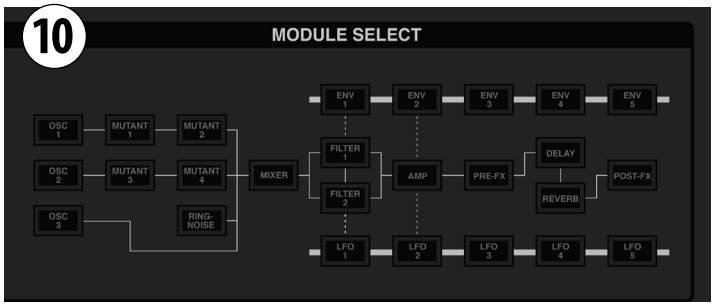
Filter Controls

Sweeping the filter frequency of a sound is a great way to heighten the emotional impact of the music. This is especially true during an arpeggio or a sequenced passage.

Hydrasynth offers several controls for exactly this purpose. You can sweep the filter frequency, adjust the resonance, and increase the drive amount of Filter 1, for example, and then switch to Filter 2 and perform similar actions. However, for Filter 2 the third knob does not control the drive amount; instead it "morphs" the filter between three states (Low Pass / Band Pass / High Pass or Low Pass / Notch / High Pass, depending on the selected Type).

For details, refer to *The Filters and their Controls (p. 51)*.

Module Select



The Module Select section has 26 Access buttons which are used to view and edit the parameters for each patch or layer. Their placement provides a visual reference for the signal flow, which starts with the Oscillators, moves through the Filters, proceeds through the effects, and is sent to the outputs.

Pressing a Module button will reveal the first page of parameters for that module. If more than one page exists, the Page buttons are used to access the other pages, as described earlier in *PAGE Up / Down buttons (p. 20)*. Full details about the parameters of each Module are found in the chapters ahead.

Performance Controls

The Hydrasynth Deluxe was designed to encourage the spontaneous exploration of sound and rhythm. Whether live or in the studio, the potential for unique performances is enhanced by the Macro controls on the Home page, as well as dedicated Filter and Arpeggiator controls. Along with those are a host of other interactive features, such as 73 Polytouch® keys, a ribbon controller, pitch/mod wheels, Octave buttons, Chord mode, a Glide button, and two front-panel headphone jacks. And thanks to a healthy number of CV inputs and outputs, the outside world can join in on the fun!

We offer several models with identical voice architecture and editing methods. And if you will forgive the shameless plug, if you buy any one of the other models you can combine their polyphony by enabling *Overflow (p. 109)*. It's a very cost-effective way to multiply the creative potential of your system.

Chord mode

A single key can play multiple notes at once by activating the [CHORD] button. But a chord must be created before the button can be used.

To create a chord, hold [CHORD] and it will flash. Then play the notes you want the chord to contain. You can press them all at once or one at a time, which allows you to build chords that are outside your normal reach. The lowest note you enter will become the root note. When you're done, release the button.

There are a few things to remember about Chord mode:

- A chord can contain between 2-8 notes; <2 notes are not stored; notes >8 are ignored.
- The chord is not saved with a patch, and will be erased when the Hydrasynth Deluxe is power-cycled.
- The Upper and Lower parts can share the same chord in Multi mode, or each can have its own chord. Those details are in *Chord mode and Multis (p. 36)*.
- Chord mode puts the keyboard into mono mode (last note priority).
- All notes in the chord will be quantized to notes within the selected scale. (See *Select a Scale (p. 76)* in *The Voice Module (p. 73)*.)
- The chord is not transmitted over USB or MIDI. A slaved device will only receive the played note.

Ribbon controller

The ribbon controller can be used three ways: to bend the pitch of held notes, as a solo synthesizer (Theremin mode), or as a modulation source only. In Theremin mode the default range is 4 octaves, so there's a 1:1 relationship to the keys. But the range can be scaled to cover 2 or 6 octaves. In Multi mode the Upper and Lower parts can have matching or independent settings. Full operational details are in the chapter *Ribbon Controller (p. 80)*.

Front Panel

The Hydrasynth Deluxe provides two headphone connectors on the front panel under the keyboard.

Headphone jacks

The two most common sizes for headphone connectors are provided. The signal and level are identical for both. The circuits were designed for compatibility with a wide range of headphone impedance ratings.

Phones volume control

Moving the level dial to the right will increase the volume to the headphones; moving the dial to the left will decrease the volume.

Rear Panel

Section	Name	Description
1	Laptop shelf	
2	Kensington lock	Helps prevent unwanted relocation
3	Main/Upper Outputs	Left (mono), Right (for stereo)
4	Lower Outputs	Left, Right
5	Sustain pedal input	Polarity sensing on startup
	Expression pedal input	Polarity can be inverted in System Setup
6	MIDI connectors	In, Out, Thru
7	USB connector	Type B for computer connection
8	DC power connector	12 volts DC, ≥2A
9	Power cable guard	Helps prevent accidental disconnection
10	Power switch	Gets the creative juices flowing!

Laptop Shelf

The laptop shelf extends the right side of the top panel to accommodate a tablet or laptop computer. This added workspace is ideal for live performance, session work, and home studios. The non-slip surface provides a firm footing for your device.

Installation is simple:

- Standing behind the keyboard, loosen the bolts on the left side of the rear panel just enough to allow the holes in the support bracket to slide completely over the bolt heads.
- Gently lower the shelf into place, allowing the grooves in the support bracket to slide down onto the bolt shafts.
- Hand-tighten the bolts to hold the shelf in place. A screwdriver can be used for the last quarter-turn, but be careful not to over-tighten; you may want to remove the shelf for later transport.

Outputs

Main/Upper Outputs

Hydrasynth Deluxe has two sets of stereo outputs. If only two channels are available on your mixer, use the Main/Upper outputs. Connect only the Left output for mono; connect the Left and Right outputs if a stereo signal is preferred.

Lower Outputs

If you have four channels available on your mixer, you can plug a couple of cables into the Lower outputs. When the Hydrasynth Deluxe is in Multi mode, the Lower part is automatically routed to those outputs when they are connected. Be sure to pan the mixer channels hard left and right for the full stereo effect.

Here are some more things to know about using the Lower outputs:

- Both Lower outputs must be connected or the Lower part will remain combined with the Main/Upper outputs.
- The Master Volume controls the Upper and Lower parts, no matter which outputs are used.

- The Balance control affects the Upper and Lower parts, no matter which outputs are used.
- In Single mode no audio is routed to the Lower outputs.

Control Inputs

Sustain

Connect a momentary footswitch here. Its polarity is detected on power-up, so any brand of pedal can be used.

Expression

Connect a variable foot pedal here. Its polarity and range can be adjusted in *The System Setup Pages (p. 101)*, which makes it compatible with a wide range of pedals.

This input can also be used as a modulation source in the Mod matrix, so it can do far more than control the volume!

MIDI

The Hydrasynth has three 5-pin MIDI connectors to allow you to interface with other devices that might not have a USB port or CV / Gate connectors.

- **MIDI Out** sends data from the Hydrasynth to another MIDI device
- **MIDI In** receives data from another MIDI device
- **MIDI Thru** passes the data that arrives at the physical MIDI In jack to another MIDI device. It does not send the MIDI information generated by the Hydrasynth Deluxe keyboard or controls.

USB

Use this port to connect the Hydrasynth Deluxe to your computer.

Power

Cable lock

There's nothing worse than having someone trip over a cable and unplug something. We encourage you to take advantage of this additional level of protection for the power supply cord.

On/off switch

There are only two options here:
O = Off and | = On.

Kensington lock

Let's face it: the music you make with your Hydrasynth Deluxe will take people places! And just in case they get a bit carried away, we've included the Kensington lock system so you can keep your Hydrasynth Deluxe from also being carried away.

Multi mode is like having two complete 8-voice Hydrasynths under your fingertips, plus a "Command Center" that...

- defines their keyboard and velocity zones;
- sets their relative levels and octaves;
- enables/disables the Arpeggiator for each;
- decides whether one or both are affected by the controllers and Macros; and
- makes each module available for independent or combined access from the top panel.

Single / Multi Mode Comparison

The following table summarizes the main feature differences of each mode. Details are provided in the sections that follow.

Feature	Differences
Simultaneous patches	Single mode offers one 16-voice patch at a time. A Multi contains two 8-voice patches. These can be layered or split and overlapped as described in *Multi Edit mode (p. 27)*.
Number of Macros	Single mode offers up to 8 Macros. Multi mode offers up to 16 Macros (8 sets of controls, 2 Macros each). You can specify Upper, Lower, or Both per set of Macro controls.
Balance control	This control is inactive in Single mode. In Multi mode it adjusts the relative levels of the Upper and Lower parts.
Upper / Lower buttons	These buttons are inactive in Single mode. In Multi mode they select the Upper and/or Lower parts for top-panel edits.
Hardware outputs	Single mode is routed entirely through the Main/Upper L/R outputs. Multi mode can use both sets of stereo outputs. The Lower part is automatically routed to the Lower L/R outputs when both connectors are used.

Mode independence

Single and Multi modes are independent in almost every way; you can switch from one mode to the other while editing and the edited patch is still there when you return. You can browse in one mode and the patch will not change in the other mode.

Note that switching between Single and Multi modes always returns to the Home page of that mode.

Patch banks: shared resources

A Multi patch is basically made from two Single mode patches, which means the two modes have a common denominator. As a result it is possible to share patches between the modes.

Single mode banks

Single mode has access to two different sets of patch banks.

- Banks A-H: You can edit these patches and save them within these banks.
- Banks M1-M5 (Upper) and M1-M5 (Lower): These are the Upper / Lower patches that reside inside the same-numbered Multis. They can be edited but you must save them to banks A-H.

Multi mode banks

Multi mode is a bit more complex. Here's the basic idea:

- The Multis reside in 5 banks (M1-M5).
- Each Multi holds two patches, and each of those is equal to a patch from Single mode.

- From inside a Multi you can browse the Single mode patch banks (A-H) and the Upper / Lower patches of other Multis.
- As soon as a patch is selected it is copied into the active part (Upper or Lower) of the current Multi, after which you can edit that patch without affecting the original patch.
- When the Multi is saved, that patch becomes a component of the Multi as its Lower or Upper part.

From that point forward the copied patch inside the Multi and the original Single mode patch exist in parallel universes, so to speak: you can move, edit, or overwrite the patch in either mode without affecting the patch in the other mode.

Color schemes

One difference between Single and Multi modes is that the top panel can be different colors in Multi mode. The Access buttons will have orange letters when you're on the Home page of either mode, but in Multi mode they change colors when one of the parts is selected.

Mode	Active part(s)	Access button letters	Can color change?
Single		Orange	No
Multi	Both	Orange	No
Multi	Upper	Yellow (default)	Yes [1]
Multi	Lower	Blue (default)	Yes [1]

[1] Upper/Lower part colors are set globally for all Multis in the *Light Menu (p. 102)*.

Overview of Multi Mode

To summarize, in Single mode a Hydrasynth Deluxe is equivalent to one 16-voice Hydrasynth. But in Multi mode it becomes two perfectly integrated 8-voice Hydrasynths, also known as the Upper and Lower parts. Taken together, they become a Multi patch.

Parts & Patches: a primer

These terms can be confusing at first because both Single and Multi modes have "patches". But those are very different things:

- A Single mode patch contains all of the parameters needed to make one Hydrasynth patch.
- A Multi mode patch contains two complete Hydrasynth patches inside one shell (the Multi patch).

But there's more to it than that: Sometimes in Multi mode the Upper and Lower components are called "parts" and sometimes they are called "patches." Here's how we'll use those terms:

- "Upper / Lower part" refers to parameters at the Multi level: balance, mode, keyboard zone, octave shift, controller settings, etc.
- "Upper / Lower patch" refers to the synth parameters contained by each Multi part.

What's a Multi patch?

Hydrasynth Deluxe holds 640 Multi patches, arranged in 5 banks of 128. Each one contains:

1. The Multi patch, with its own name, category, and color
2. Multi Edit settings such as the Dual/KeySplit mode, note and velocity ranges, crossfades, and controller settings
3. A Macro Assign page, where you can route a Macro to one or both parts
4. The Upper and Lower parts, each with a self-contained patch that is completely independent from Single mode.

Patch selection in Multi mode

There are two levels of patch selection in Multi mode: Banks M1-M5, where Multis are selected, and the patch banks inside a Multi, where patches are selected for the Upper/Lower parts. It's important to remember that the Left/Right arrows and the Patch knob will always select a new Multi, even when one of the parts has been selected. It's different when browsing

for patches for the Upper/Lower parts; then you can use the Patch knob, the Left/Right arrows, and their [SHIFT] combinations without selecting a new Multi. For more information, see *Browsing in Multi Mode (p. 29).*

Display contents

Let's look at the displays on the Multi mode Home page. To get there from Single mode, press [MULTI]. If you're already in Multi mode, select Both by pressing [UPPER] and [LOWER] at the same time. Either of these actions takes you to the Multi mode Home page.

Left display: Names & numbers

On the Home page the Left display contains information about the current Multi.

Row	Contents
1	Multi name
2	Multi bank, program number, and category
3	Up arrow and name of Upper patch
4	Down arrow and name of Lower patch

When a new Multi patch is selected with the Patch knob or arrows the Left display temporarily shows the names of 5 adjacent Multis, including the current Multi. After 2 seconds of inactivity the screen returns to the Home page.

Right display: Macro routing

On the Home page the Right display provides information about what the Macro controls will do when activated. When the Macro label is "Macro (1-8)", that means neither part uses that Macro. When the label is "Both" the Macro is controlling the Upper and Lower parts, but their Macro names don't match. (Their assignments may not match either, which can be fun!)

A specific name for a Macro can mean several things:

- The Macro is controlling only the Upper or Lower part. (Hint: Look for the Up/Down arrow near the value.)
- Both the Upper and Lower parts are being controlled, and their Macro assignments match (or at least their names do).

To the left of each Macro name there are arrows that point up, down, or both up and down. This tells you at a glance whether a Macro is controlling both parts or only one (and which one).

How to route a Macro

The Macro Assign page lets you route the Macro controls to a specific part or to both parts. Assuming you're already in Multi mode, here's how to do it:

1. Select Both by pressing [UPPER] and [LOWER] at the same time. This takes you to the Home page.
2. Press [MACRO ASSIGN] to enter the Macro Assign page.
3. Turn the Control knob for the specific Macro you want to route, then select Both, Upper, or Lower.
4. Save the Multi to preserve the routing assignment change.

You must select the Upper or Lower part in order to create or edit the Macros themselves. To learn how, see *Make a Macro (p. 86)*.

Multi mode controls

Multi mode has four dedicated controls:

- The **Multi** button switches from Single mode into Multi mode, and then cycles between the Multi Edit pages.
- The **Balance** control sets the relative levels of the Upper and Lower parts. It is inactive in Single mode.
- The **Lower** and **Upper** part select buttons select one of the parts for top-panel editing, and also allow you to browse the patch banks and select a patch for the selected part. For details about that see *Browsing in Multi Mode (p. 29)*.

Note that when Single mode is selected, these four controls are inactive.

Multi Edit mode

The Multi Edit pages contain parameters that let you tailor the settings for the Upper and Lower parts. These are described in the next two sections.

You can jump to Multi Edit mode from any page by holding [SHIFT] and pressing

[MULTI]. If you're already in Multi mode and have Both selected, simply press the Multi button to reach the first page of parameters. A second press takes you to the second page of parameters, and a third press cycles back to the first page, etc.

Multi Edit: Page 1

The Right display contains different parameters for page 1 depending on the value of the first parameter. Use Control knob 1 to select the mode for the Multi: Dual or KeySplit. This parameter is omitted from the Page 1 tables.

Page 1: Multi mode = Dual

These parameters are visible only when the Multi mode = Dual.

Control	Name	Range	Description
2	VelSplit	Off, On	Enables or disables VelSplit
3	Lo Max [1]	2 – 127	Sets the upper velocity limit for the Lower part [2]
4	Up Min [1]	1 – 126	Sets the lower velocity limit for the Upper part [2]
5	Lo Level	-36.0 / +12.0 dB	Controls Lower part level
6	Up Level	-36.0 / +12.0 dB	Controls Upper part level
7	Lo Fade [1]	0 – 127	The velocity range required for transition to zero level
8	Up Fade [1]	0 – 127	The velocity range required for transition to full level

[1] Visible only when VelSplit = On

[2] Partially linked: Lo Max can not exceed Up Min by more than one value, and vice versa. Overlap is unlimited.

Dual mode includes two types of velocity transitions: Cross-switching and crossfading.

- If VelSplit = Off, the Upper and Lower parts are triggered by all velocity values, and their relative levels can be set by the Balance control.
- If VelSplit = On, velocity can switch between the Upper and Lower parts or crossfade between them depending on the Lo Fade and Up Fade settings. Note that the limits for the Upper low velocity and the Lower high velocity can overlap, so there can be a center "velocity window" where both parts are available.

Page 1: Multi mode = KeySplit

The following parameters are visible only when the Multi mode = KeySplit.

Control	Name	Range	Description
2	KeySplit	C1 to C7	Determines the Lower / Upper split point [1]
3	Crossfade	0 – 80	The note range required for full transition between parts, in multiples of 2
5	Lo Level	-36.0 / +12.0 dB	Controls Lower part level
6	Up Level	-36.0 / +12.0 dB	Controls Upper part level

[1] Hold Control button 2 and press a key to change the KeySplit point.

KeySplit mode can have a split point that is either absolute or gradual by using the Crossfade parameter to define the width of the crossfade zone. For example:

- A setting of 0 means there is no crossfade, and the transition is instant between the Upper / Lower parts.
- A setting of 20 creates a crossfade zone 20 keys wide between the two parts (10 keys below the KeySplit point and 10 keys above it). This means the Upper part takes 10 keys to fade

in from zero and reaches its full level at the KeySplit point, after which the Lower part takes another 10 keys to decrease from its full level to zero.

Multi Edit: Page 2

These parameters are always visible on page 2. Edit fields 5-8 enable specific controllers to affect one or both parts within the Multi.

Control	Name	Range	Description
1	Lo Oct	-/+ 4 octaves	Transpose Lower part in octaves
2	Up Oct	-/+ 4 octaves	Transpose Upper part in octaves
3	Balance [1]	-/+ 64.0	Controls relative levels of Lower / Upper parts
4	ARP	Mono [2] Separate [3]	Decides if Arp settings are shared by both parts (Mono) or independent (Separate)
5	SusPedal	Both, Upper, Lower	Sets per-part response to the sustain pedal.
6	Ribbon	Both, Upper, Lower	Lets one or both parts respond to the ribbon.
7	PitchBnd	Both, Upper, Lower	Lets one or both parts respond to pitch bend.
8	ModWhl	Both, Upper, Lower	Sets per-part response to the mod wheel.

[1] Linked to the Balance control: changing the value there also changes it here.

[2] Mono: Both parts use the same Arp settings. The Arp pattern can cross over the KeySplit / VelSplit boundaries.

[3] Separate: The parts can have independent Arp settings. There is no crossover of the Arp pattern between parts.

For details about the Arp Mono/Separate settings, see *Multi mode & the Arpeggiator (p. 33).*

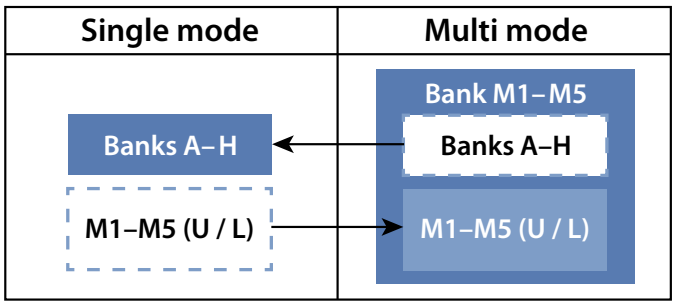
Browsing in Multi Mode

Multi mode uses the Browse feature a couple of ways. You can browse the Multi patches themselves, and can also browse inside a Multi for new Upper / Lower patches. In all cases the same options are available: Find By Patch #, Find By Name, and Find By Category. These are described in the section *Using the Browser (p. 97)* in the Patch Management chapter. The focus of this section is to explain how to browse at each level of a Multi.

Note: For all browse-related sections we'll have the Browse mode set to Find By Patch #.

Bank / patch map

The following graphic may help to visualize the relationship between Single and Multi modes and how each handles the same patch banks differently.



Patch bank access

As shown in the graphic, Single mode has access to two sets of patch banks.

- Banks A-H contain patches you can edit and save to a location within those banks.
- Banks M1-M5 contain the Upper / Lower patch banks of Multi mode. You can edit those patches, but the edits can't be saved into banks M1-M5. They must be saved to a location in banks A-H.

The same graphic shows that Multi mode has access to three sets of patch banks:

- Banks M1-M5 contain the Multis and their Upper / Lower patch components.
- Browse banks M1-M5 from within an Upper or Lower part to audition the Upper / Lower patches of other Multis. The selected patch is copied into the active part. Any edits you make become part of that Multi when it is saved.
- Browse banks A-H from within an Upper or Lower part to audition Single mode patches. The selected patch is copied into the active part. Any edits you make can't be saved to banks A-H; they become part of the Multi when it is saved.

It is possible to copy an Upper / Lower patch into banks A-H. To do this, switch to Single mode, locate the Upper / Lower patch in the appropriate M bank, and save it from there to the desired A-H location. See *Copy Upper/Lower patch to Single mode (p. 31)* for step-by-step instructions.

Browse Multi patches

Browsing the Home page of Multi mode takes you through the Multi patch list (i.e., banks M1-M5). If you're already in Multi mode, press [UPPER] and [LOWER] at the same time to reach the Home page. Now use these techniques:

- Turn the Patch knob or press a Left/Right arrow to select an adjacent patch.
- Hold [SHIFT] and press a Left/Right arrow to jump +/- 10 patches.
- Hold [SHIFT] and turn the Patch knob to jump banks.

If you want to select a different patch for an Upper / Lower part inside a Multi, read the next section.

Browse Upper/Lower patches

Selecting a different patch for an Upper / Lower part requires an extra step. First save any edits you don't want to lose, then try this example:

1. Select any Multi.
2. Turn the Balance control fully clockwise. We'll focus on the Upper part for now.
3. Press [UPPER] to select the Upper part for editing.
4. Press [BROWSE].
   Notice the Right display: Edit field 1 says "Up Patch: Current". This means the Upper patch of the Multi has not been changed. Its name and category are shown in Edit fields 2 and 3.
   Let's continue:
5. Turn Control knob 1 in either direction to select the adjacent patch. Notice that the patch name and category change appropriately in Edit fields 2 and 3.
6. Turn Control knob 1 back to where it was. When you reach the original Upper patch, Edit field 1 says "Current" again.
7. Use Control knob 5 to select adjacent banks.
8. Now try the other patch selection techniques: use the Patch knob and the Left/Right arrows, with and without holding [SHIFT]. It works the same as browsing the Single or Multi banks. Just be careful to select the Lower / Upper part before pressing [BROWSE] or else you'll select a new Multi instead.

Note that switching an Upper / Lower patch resets the octave transposition of that part to 0. Once you have the patch you want, you can set the desired octave transposition value on *Multi Edit: Page 2 (p. 29)*.

Copy Upper/Lower patch to Single mode

At some point you will find an Upper / Lower patch that you want to play in Single mode with full 16-voice polyphony. For example, let's say you want the Lower patch from Multi M3-021. Here's how to do that.

1. Switch to Single mode and choose an available location.
2. Hold [SHIFT] and turn the Patch knob to jump over the Single mode patch banks until you reach patch M3-001L.
3. Still holding [SHIFT], press the Right arrow twice to reach M3-021L.
4. Press [SAVE]. The Left display says "Banks M1-M5 are read-only".
5. No problem! Keep holding [SHIFT] and turn Control knobs 1 and 5 until you find the location you chose in step 1.
6. Give the patch a new name and category if you like, then press [SAVE] to complete the operation. The patch is now located in Single mode.

You can also use an Upper / Lower patch on its own without copying it into banks A-H. First, locate the patch in Single mode as described in steps 1-3 above, then follow the instructions in the next section.

Favorites: From both modes

Your Favorites banks can hold patches from Single mode and Multi mode side-by-side. The same methods are used for each mode:

- Press [BROWSE]
- Press Control button 8 to enter Favorite Assign...
- Select the desired Favorites page using the Page up/down buttons
- Choose an available Favorites location
- Press and hold the Control button next to that location. The name of the selected patch appears in that Edit field.

You can access your favorite patches at any time: just hold [SHIFT], press [BROWSE], and navigate to the desired group of Favorites.

Note: MIDI Channels might change between Multi and Single patches. If a note becomes stuck on a MIDI slave, hold [SHIFT] and press [HOME] to send an All Notes Off message.

Save the Multi

The Save page has two pages in Multi mode. If you are not familiar with the features of page 1, please see *Save the Patch (p. 99)* in the Patch Management chapter for complete descriptions of each parameter. We'll only cover the basics here.

Multi Save page 1

If Protect is Off, press the [SAVE] button to access the first page.

Control	Parameter	Range	Description
1	Select target location	5 banks x 128 patches	Scroll to select; hold [SHIFT] + scroll to jump +/-10 patches
2	Multi patch name	Numbers, letters, symbols	Select up to 16 characters
3	Category	(various)	Choose Multi category
4	Macro options	Return, Save	Process current Macro values (see *Macro Options (p. 100)*)
5	Bank	Multi M1-M5	Select target Multi bank
6	Name of current target	(in memory)	This Multi will be replaced if you [SAVE]
8	Color	32 colors	Select LED color for wheels, Patch knob

Once you have those items the way you want them, press the Down arrow to access page 2.

Multi Save page 2

Page 2 lets you rename the Upper / Lower patches and assign their categories. These can be different than the category of the Multi itself, which is set on page 1.

Control	Parameter	Range	Description
1	(Upper)	(view only)	Use as reference for the top row
2	Upper patch name	Numbers, letters, symbols	Select up to 16 characters
3	Upper patch category	(various)	Choose Upper patch category
5	(Lower)	(view only)	Use as reference for the bottom row
6	Lower patch name	Numbers, letters, symbols	Select up to 16 characters
7	Lower patch category	(various)	Choose Lower patch category

Note: The Upper / Lower Access button colors are not chosen here; see *Light Menu (p. 102)*.

Edit Multi Parts

In Multi mode the Hydrasynth Deluxe top panel can edit the Upper patch, the Lower patch, or both patches at the same time.

Edit Upper or Lower

There may be a time when you want to edit one part of a Multi but not the other. For example, if there's an arpeggio happening on both sides of a KeySplit and you want to open the filter for the Upper patch but not the Lower patch, it's easy to do. Simply press [UPPER] and every synthesizer control on the top panel can now edit the Upper patch without editing the Lower patch. When you want to use the top panel to edit the Lower patch, press [LOWER].

You can keep editing the Upper and Lower patches like that until they are exactly the way you want them. But just to be on the safe side, as soon as you reach the point where you'd hate to lose what you've done so far, save the Multi. All of the edits to the Upper and Lower patches will be saved as part of the Multi, including any changes you made to the Multi itself.

Page memory

When you switch between the Upper and Lower parts while editing their parameters, the selected part will change but the Hydrasynth Deluxe stays on the page you were editing. There are a few exceptions, though:

- Voice Scale Edit
- Macro Edit
- Mod Matrix Edit
- OSC Wavelist Edit
- Mutant PW-ASM Custom Edit
- LFO Step Edit
- Ribbon Scale Edit

In this case, switching between the Upper / Lower parts will relocate the page being edited to the next-higher menu. In the case of the Mod Matrix Edit page, the next-higher menu is the Home page for the selected part.

Edit Both

Sometimes you may want to edit parameters for the entire Multi at the same time. For example, if the Multi is in Dual mode and you want to close the filter for both patches at the end of a song, it's simple: Press [UPPER] and [LOWER] to select Both parts. Now every synthesizer control on the top panel can edit the Upper and Lower patches at the same time.

Note that editing a synth parameter with Both parts selected forces each patch to have the same value for that parameter. They are not adjusted proportionately.

That can be used to your advantage, though. Let's say you're creating a Multi and you want the Upper and Lower patches to have identical reverb settings. Simply press [UPPER] and [LOWER] to select Both, then press [REVERB] to access that module. Now make the desired changes, and both the Upper and Lower patches will inherit them. This technique works on every module: [OSC 1-3], [LFO 1-5], [PRE-FX], etc.

Note that when you edit both parts the Upper values are shown, but the Lower values may be different. Any edits are applied to both parts, but the other values remain as they were for each part.

Remember: If you want independent values for a parameter, edit the Upper and Lower patches separately.

Multi mode & the Arpeggiator

The Arp parameter on *Multi Edit: Page 2 (p. 29)* decides if the Arp settings are shared by the Upper and Lower parts or completely independent. There are two settings, and your choice is saved with each Multi.

Arp mode: Mono

The Upper and Lower parts share a single arpeggiator pattern and all of its settings. The Upper patch settings are used by default, but you can change them any way you like. The arpeggio can cross over the KeySplit / VelSplit boundaries, and the crossfade settings are applied.

The controls in the Arpeggiator section affect the pattern whether Upper, Lower, or Both are selected. For example, when Arp = On, it's enabled for both parts; when Arp = Off, it's disabled for both parts.

Dual mode

When VelSplit is On and one of the parts is triggered by the note velocity, that part is heard when the arpeggiator plays that note in each octave. When VelSplit is Off, both parts play all the notes.

KeySplit mode

The arpeggio crosses the KeySplit point and uses both parts as it follows the various settings such as Mode, Octave, etc. For example, you might hear a few notes from the Lower part in the first octave, a mixture of notes from both parts in the second octave, and only notes from the Upper part in the third octave.

Arp mode: Separate

The Upper and Lower parts have independent arpeggiator settings, but they can sync (See *Shared tempo (p. 34)*). The arpeggio can cross over the KeySplit / VelSplit boundaries within the crossfade range, but the crossfade gain effect is not applied. Disable the arpeggiator and the crossfade gain effect is restored.

The controls in the Arpeggiator section affect the Upper and Lower patterns when Both are selected. But you can also select one part and adjust its arpeggiator settings without affecting the other part. In other words, the arpeggiator can be started, modified, and stopped independently per part.

Dual mode (VelSplit = Off)

The parts can each play their independent Arp patterns throughout the entire MIDI velocity range. Their settings do not affect each other; the notes used to trigger the Arps are the only thing they share.

Dual mode (VelSplit = On)

When the arpeggiator is active for both parts, notes played within the lower velocity range will trigger the lower arpeggiator or be added to it; notes played within the upper velocity range will trigger the upper arpeggiator or be added to it.

For example, if VelSplit = 80, notes played within the velocity range 1-80 become part of the lower arpeggio. Notes that are played with a velocity value of 81-127 become part of the upper arpeggio.

KeySplit mode: Separate

The Upper/Lower arpeggiators can only be triggered by keys within the defined split zone. It might seem like the patterns are "crossing over" if the octave settings cause the pattern to reach a pitch that is technically above or below the KeySplit point, for example. But the patterns won't trigger the sound on the other side of the split point like they do when Arp = Single.

Shared tempo

One of the coolest features of the Hydrasynth Deluxe is its dual arpeggiator. Whether a Multi is split or layered, its Upper/Lower parts can play independent, complementary patterns simultaneously.

Each Multi has its own tempo, so when you're browsing for a new Upper/Lower patch, the selection does not affect the tempo. This makes it possible to audition any two arpeggiated patches to see how they sound together. There's a huge number of potential combinations (the factorial of 2304, to be exact)!

As a refresher, there are two parameters that have a significant impact on the way the arpeggiator works:

- **Tempo Lock** (*Master: Page 2 (p. 102)*): This overrides the per-patch tempo settings, so every patch assumes the same tempo for its arpeggiator and other synchronized elements (LFOs, Envelopes, Delays, etc.).
- **Clock Lock** (*Arp parameters: page 2 (p. 83)*): With this parameter enabled for both parts their arpeggiator patterns will remain in perfect sync. When it is disabled the Arps can be triggered at any instant; the patterns will proceed at the master tempo but their notes will probably "flam", and the overall effect will be more chaotic rather than "tight".

  Whichever setting you want for the Multi, be sure to select Both to make the edit (press [UPPER] and [LOWER] at the same time), and then navigate to Arp Edit page 2. That way the Upper / Lower patches will inherit the same setting for this parameter with fewer button presses.

The Ribbon in Multi mode

You can instantly set the ribbon so that it affects the Upper and Lower parts the same way: just select Both parts (press [UPPER] and [LOWER] at the same time), then press [RIBBON] and use Control knob 1 to set the mode. When first selected, PitchBend and Theremin modes impose identical responses on each part. Their responses to Theremin mode can diverge afterward by altering specific settings for the Upper / Lower parts individually.

And you could set the Upper to Theremin mode and the Lower to PitchBend, for example, or set both to Theremin mode and use different scales, etc. This flexibility allows for a lot of experimentation, and above all, a lot of fun!

The per-part response to the Mod Only setting depends entirely on whether the ribbon is used as a mod source for one or both of the Upper / Lower patches, where it is routed, what the mod amounts are, etc. These settings could be similar or radically different. The beauty of Upper / Lower patch independence is that you can dial in exactly the ribbon response you want for each part.

MIDI and Multis

You can configure the Upper and Lower parts to send and receive on different MIDI channels, or to send on the same MIDI channel as Single mode. This is done using the MIDITxRx parameter on System Setup *MIDI: Page 5 (p. 106).* The details are there; we'll only give a basic overview here.

MIDI TX / RX = AsGlobal

When AsGlobal is selected all MIDI data is sent and received on the Global Tx and Rx channels, which can be different. The Upper/Lower channel assignments are hidden because both parts send and receive on the Global channel(s).

MIDI TX / RX = Separate

When Separate is selected, individual MIDI channel settings are available for Single mode and the Upper/Lower parts. The Tx and Rx MIDI channel assignments do not need to match. The MIDI Transmit channels are mutually exclusive; e.g., if TXGlobal = 1, that value is hidden for the Upper/Lower parts.

The Upper/Lower Receive channels are also mutually exclusive; if a value is selected for the Lower part it is hidden for the Upper part, and vice versa. RX Global can share a MIDI Receive channel with one part or the other, but not both.

Note that MIDI Program changes and Bank select messages are always sent on the Global TX channel.

Parameter Automation

To automate the Upper/Lower parts independently from your DAW, select MIDI TxRx = Separate on *MIDI: Page 5 (p. 106)* and choose the desired channels for each part. Then set Param Tx/Rx to CC or NRPN (see *Parameter send/receive options (p. 108)*), whichever works best with your DAW.

With these settings you can make independent changes to the Upper and Lower parts. But it's also possible to make identical changes to both parts as needed; just send anything but the note data to the Global channel. Note data must be sent directly to the Upper/Lower MIDI channels.

This means that with the default MIDI TxRx values, the Upper part responds to parameter and controller data on channels 1 + 3, but note data must arrive on channel 3. The Lower part responds to parameter and controller data on channels 1 + 2, but note data must arrive on channel 2.

More about Multi Mode

When you enter Multi mode the capabilities of the Hydrasynth Deluxe are more than doubled. This is truly a situation when "the whole is greater than the sum of the parts."

Upper / Lower outputs

The entire sound of the Hydrasynth Deluxe is available at the Main/Upper outputs: the Upper and Lower parts with all of their effects. But if you'd like to have independent outputs for the Upper and Lower parts, simply plug a pair of cables into the Lower L/R outputs as well. The Lower part is automatically routed to those outputs when both cables are connected.

This unleashes a host of audio routing options: Upper to front, Lower to rear, complementary patches and effects, pads and arpeggios that circle the room...a person could get lost in the music. That's what it's all about for us.

Initialize Multi / Upper / Lower

In addition to all the ways *The INIT button (p. 18)* can be used, the following levels of initialization are available. Starting in Multi Mode:

1. Hold [INIT] and press [UPPER] to initialize the Upper part. Press [INIT] again to confirm. If the Upper part is already selected, simply press [INIT] twice.

2. Hold [INIT] and press [LOWER] to initialize the Lower part. Press [INIT] again to confirm. If the Lower part is already selected, simply press [INIT] twice.
3. To initialize both parts, simply press [INIT] twice if you have just entered Multi mode, or if the current Multi has just been selected and no other modules have been accessed. Note that this does not initialize the Multi Edit menu.
4. To initialize only the Multi Edit menu, hold [INIT] and press [MULTI]. No other aspects of the Multi will change.

For a list of modules and parameters you can initialize, see *Control Combinations (p. 113)*.

Randomize Multi / Upper / Lower

The randomization methods described for *The RANDOM button (p. 18)* apply equally to the patches in the Upper and Lower parts (i.e., randomize a parameter or a Module). There's even more fun to be had in Multi mode!

Generate random patches

You can generate a random patch for the Upper or Lower parts inside a Multi, or randomize both at the same time:

1. Hold [RANDOM] and press [UPPER] to randomize the Upper part. Press [RANDOM] again to confirm. If the Upper part is already selected, simply press [RANDOM] twice.
2. Hold [RANDOM] and press [LOWER] to randomize the Lower part. Press [RANDOM] again to confirm. If the Lower part is already selected, simply press [RANDOM] twice.
3. If both [UPPER] and [LOWER] are already selected (but not held), press [RANDOM] twice to randomize both parts. You can also simply press [RANDOM] twice if you have just entered Multi mode, or if the current Multi has just been selected and no other modules have been accessed. Note that this does not randomize the Multi Edit menu.
4. To randomize only the Multi Edit menu, hold [RANDOM] and press [MULTI].

Randomization amounts

Don't forget you can set percentages to control the amount of randomization that happens; see *Percent of Randomization (p. 19).* For a full list of modules that can be randomized, see *[RANDOM] + Button X (p. 114)*.

Select random patches

Use these random patch selection methods when you're looking for that unexpected combination of factors that turn a Multi into magic:

1. To select a random patch for the Upper or Lower part inside the current Multi, first select [UPPER] or [LOWER], then press [BROWSE]. Next, simply hold [RANDOM] and press Control button 1. A new patch will be chosen from one of the 18 patch banks, including Single and Multi modes. All other aspects of the Multi will remain unchanged.
2. To select a random Multi patch from banks M1-M5, hold [RANDOM] and press one of the Left / Right arrows. Press [RANDOM] again to confirm. This works from inside any module while in Multi mode.

Chord mode and Multis

You can have two different chords available for the Upper and Lower parts in Multi mode. If you're not familiar the process of creating a chord, please review the information in *Chord mode (p. 22).*

- To create a chord for the Upper part, press [UPPER], then hold [CHORD] and play the notes you want the chord to contain.
- To create a chord for the Lower part, press [LOWER], then hold [CHORD] and play the notes you want the chord to contain.

If you want both parts to play the same chord, first press [UPPER] and [LOWER] at the same time. Then create the chord using the same process. Note that this will overwrite any per-part chords you had previously created.

VoiceMod Edit and Multis

The *VoiceMod Edit (p. 78)* list has two pages in Single mode, but only one page in Multi mode. This is true for the Upper part, the Lower part, and the Multi itself. Use the same method to access this feature:

- Press [UPPER], [LOWER], or both at the same time
- Press [VOICE] three times to access page 3
- Press Control button 7 to enter the VoiceMod menu
- Use Control knobs 1-8 to set a positive or negative value for Voices 1-8.

So what happens inside the Multi as you *Browse Upper/Lower patches (p. 30)*?

- Only the Voice 1-8 settings are used. If a Single mode patch is selected (Banks A-H) the Voice 9-16 settings are ignored.
- The Upper part Voice 1-8 settings are shown when you *Edit Both (p. 32)*, but the Lower part settings may be different. Any edits are applied to both parts, but the other settings remain as they were for each part.

For more details, see *VoiceMod Edit (p. 78)*.

CVs and Multis

The CV inputs and outputs work the same way in Single and Multi modes. This includes the Pitch, Gate, Mod, and Clock outputs and the Mod 1 / Mod 2 inputs. Please refer to *The CV / Gate Section (p. 94)* for more information.

The colored Access buttons select particular modules for editing, and can also be used to create new mod routes. They are arranged in the order of signal flow, from left to right: [Osc] > [Mixer] > [Filter] > [Amp] > [FX]. The top panel graphics indicate this, and also show the interactions and independence of the modules.

There are two exceptions to the signal flow rule:

- The Voice module, located below the Exit button. It provides features such as the Unison modes and Scale.
- The Ribbon module, which defines the behavior of this performance control.

Module Groups

We'll only touch briefly on the modules here; most have their own chapters. Their purpose here is to introduce operations that can be performed by any two modules from any module group.

For the sake of simplicity, the descriptions and examples for each module will assume the Hydrasynth Deluxe is in Single mode (unless otherwise noted). Details about using the modules in Multi mode are provided in *Edit Multi Parts (p. 32)*.

Oscillator group

The Oscillator group includes Oscillators 1-3, the four Mutant modules, and the Ring-Noise module. After the waveforms are generated by Oscillators 1 and 2 they pass through their respective Mutant modules before heading to the Mixer module, where they are joined by the outputs of Oscillator 3 and the Ring-Noise module.

The modules that are in the Oscillator group are described in *The Oscillator Group (p. 41)*.

Mixer module

This module has some simple but important functions, including the relative levels and panning of the oscillators, how they are routed through the filters, and whether the filters are in a series or parallel configuration. Full details are in *The Mixer Module (p. 49)*.

Filter group

Filter 1 and Filter 2 are similar in name and function but their features are very different.

- **Filter 1** has 16 different filter models, including Low- / High- / Band Pass and vocal formant options.
- **Filter 2** is a multi-mode filter with two types: Low Pass / Band Pass / High Pass and Low Pass / Notch / High Pass. Each type can "morph" between the three states.

The filters can be placed in parallel or series. Full details are in *The Filters and their Controls (p. 51)*.

Envelope group

All five Envelopes have identical parameters, and each can be triggered by up to four sources. Dotted lines connect ENV 1 to the Filter group and ENV 2 to the Amp module, which means they have pre-wired connections that show up as parameters in those modules. But all Envelopes can be used as modulation sources for any destination, and Envelopes 3-5 can be used as additional modulation sources for the Filters and the Amp module.

Note that Envelope 2 does not show up by name inside the Amp module, but its input level is controlled by the AmpLevel parameter.

LFO group

All five LFOs have identical parameters. Dotted lines connect LFO 1 to the Filter group and LFO 2 to the Amp module, which means they have pre-wired connections that show

up as parameters in those modules. But all LFOs can be used as modulation sources for any destination, and LFOs 3-5 can be used as additional modulation sources for the Filters and the Amp module.

Amp module

The Amp module contains only three parameters:

- **LFO 2 Amount** adjusts the amount and polarity of the effect LFO 2 has on the Amplitude of the patch.
- **Velocity** controls the velocity response of the Amplitude stage. Negative values invert the response: increased velocities reduce the amplitude.
- **Amp Level** can be used to compensate for quieter or louder output from the oscillators and filters.

For information about how these parameters interact, see *The Amp Module (p. 55)*.

FX group

Rounding out each patch is a healthy array of effects processors, from pitch effects to spatial emulations and much more. With these a raw sound can become sweet or angry, pure or distorted, straightforward or mangled.

Once the rest of the synth has had its way, the signal flow is [Pre-FX] > [Delay] > [Reverb] > [Post-FX] > Output. For specific details read *The Effects (p. 67)*.

Other Modules

Voice module

Though it isn't located in the Module Select section, the Voice module has a significant impact on each patch. It determines how many notes are available, which ones will play, and how they sound, through parameters such as Polyphony, Detune, Analog Feel, Random Phase, Glide, and Scale. These are fully described in *The Voice Module (p. 73)*.

Ribbon

The Ribbon controller has three modes of operation: Pitch Bend, Theremin, and Mod Only. It can be used in several ways as a modulation source via the Mod Matrix while also being used in Pitch Bend mode or Theremin mode at the same time. Full details are available in *Ribbon Controller (p. 80)*.

Module Shortcuts

The top panel buttons can do a lot more than access parameters for editing. They can be used to create a mod route within seconds, for example, or to copy parameters between similar modules.

Create Mod routes

There's a shortcut to set up one or more mod routes very quickly. Instead of accessing the Mod Matrix through its button and navigating to the right page and field, try this from the Home page:

- Press and hold the module button for the desired *Modulation Sources (p. 92)*
- Press the module button for the destination you want to modulate. See *Modulation Destinations (p. 93)*

If you've chosen valid components for the route the Right display will jump directly into the Mod Matrix at the first empty modulation slot, with the first parameter of the destination module highlighted. From there you can select a different parameter within that module using the upper Control knob and set the modulation amount with the lower Control knob. If the destination parameter has a top panel knob available, turning that will select it as the destination.

This technique can also be used inside the Mod Matrix pages. The advantage to doing it there is that when you hold a source button, all of the potential mod route destinations will light up. They don't do that from the Home page.

The Mod Matrix will be covered more fully in *The Mod Matrix (p. 90)*.

Select Macro Destinations

When Hydrasynth Deluxe is on the Home page the Control knobs and Control buttons are capable of adjusting up to 8 parameters each (16 in Multi mode). The module buttons make it easy to set these up.

First the Hydrasynth Deluxe must be on the Macro Assign page, where the module buttons become shortcuts to select the parameters you want to control. This is significantly faster than scrolling through all of the other modules to reach the one you want.

Everything you need to know about setting up Macros is in the chapter *Mastering the Macros (p. 86)*.

Copy / Paste settings

Some modules are identical, and their parameter values can be copied from one module to another. For example, you can copy the settings from Oscillator 1 to Oscillator 2, or vice versa, because their data is interchangeable.

Some modules have unique features and capabilities and their data is *not* interchangeable. For example: you can't copy the settings from Oscillator 3 to Oscillator 1 because their parameters are very different.

Copy / paste procedure

The process of copying the settings between compatible modules is simple:

- Press and hold the Save button: All modules that are potential copy sources are lit
- Select the copy source: Only potential paste destinations remain lit
- Select the paste destination. The process will execute and all buttons will become unlit, indicating success.

Here's a real-life example: Let's say you want to copy the settings from Envelope 1 to Envelope 2, and then make some slight adjustments so Envelope 2 comes in more slowly and fades out sooner. It's easy: Hold [SAVE], press [ENV1], and then press [ENV2]. Release the Save button and you're ready to edit Envelope 2.

Modules that will

When the Save button is held some of the Module buttons are lit. These are the ones that can be copied and pasted. There are limitations, of course; the parameters of an Oscillator cannot be pasted to one of the Filters, for example. Here's a chart that shows the possible combinations.

Modules	Copy/Paste is possible between...
Oscillators	Oscillators 1 and 2
Mutants	Mutants 1, 2, 3, or 4
Envelopes	Envelopes 1, 2, 3, 4, or 5
LFOs	LFOs 1, 2, 3, 4, or 5

Modules that won't

When the Save button is held some of the Module buttons are not lit. These have unique parameters and can not be copied and pasted.

Modules	Copy/Paste NOT possible...
Oscillators	Oscillator 3, Ring-Noise
Filters	Filter 1, Filter 2
Effects	Pre-FX, Delay, Reverb, Post-FX
Others	Mixer, Amp

Oscillators are the foundation of a patch. They generate the most basic component of the sound, which is then shaped by other components such as Mutants, Filters, Envelopes, etc.

Hydrasynth has 3 oscillators per voice. Oscillators 1 and 2 can operate in two different modes (Single and WaveScan); Oscillator 3 has only one mode (Single). The same waveforms are available in both modes, but the features of each mode are very different.

The Mutant modules affect an oscillator the same way a mask or lipstick affect a face: they change the way the underlying component is presented to the world. The Ring-Noise module does a similar thing: it produces a sound based on the sum and the difference of two input signals.

The Oscillator, Mutant, and Ring-Noise modules form the Oscillator group. We'll cover them all in this chapter.

Settings can be copied between identical modules (Osc 1 and 2, Mutants 1-4): Hold [SAVE], press and release the source, and then press and release the destination. Then release [SAVE].

Oscillators 1 and 2

The features of these oscillators are identical, so the following descriptions apply to both. For a list of the available waveforms see the *Waveform List (p. 48)* at the end of this chapter.

Switching modes

To switch an oscillator between Single and WaveScan modes, access [OSC 1] or [OSC 2] and use Control knob 1.

Oscillator mode: Single

This Oscillator mode provides only a single waveform to the sound, hence the name. There's a lot you can do with a single waveform, though: the Mutant modules and the Ring Modulator make sure of that.

This mode has one page of parameters.

Parameter	Range	Description
Wave	219 options (see *Waveform List (p. 48)*)	Choose a waveform as the starting point
Semi	+/- 36 semitones	Coarse tuning of oscillator pitch. Use [SHIFT] to jump by 12 semitones.
Cents	+/- 50 cents	Fine tuning of oscillator pitch
BitRedux	(various)	Controls oscillator resolution; see *Oscillator Bit Reduction (p. 42)*
Keytrack	0-200%	Sets keyboard pitch tracking. 0 = fixed pitch; at 200% a 1-octave difference on the keyboard changes the pitch by 2 octaves. Default = 100%.

Oscillator mode: WaveScan

This Oscillator mode offers all of the same waveforms as the other mode, but then allows you to select up to eight of them in a Wavelist. WaveScan will morph gradually between the positions in the Wavelist, using an LFO or some other source through the Mod Matrix.

We'll list the parameters first and describe them in detail later. Some are also present in the Oscillator mode "Single":

Parameter	Range	Description
Wavelist Edit...	(access)	Press Control button 2 to access the list. (See Wavelist Edit page below.)
Semi	+/- 36 semitones	Coarse tuning of oscillator pitch. Hold [SHIFT] to jump by 12 semitones.
Cents	+/- 50 cents	Fine tuning of oscillator pitch
BitRedux	(various)	Controls oscillator resolution. (see Oscillator Bit Reduction below)
WaveScan	1.0 to 8.0 in steps of 0.1	Select the starting position of the WaveScan. Hold [SHIFT] to jump by whole numbers. An intermediate value morphs between two waveforms, as seen in the Left display.
Keytrack	0-200%	Sets keyboard pitch tracking. 0 = fixed pitch; at 200% a 1-octave difference on the keyboard changes the pitch by 2 octaves. Default = 100%.

Wavelist Edit page

This lower-level page lets you pick a waveform for each of the 8 WAV locations. Options include OFF, Silence, and any one of the 219 waveforms. Note: Wave 1 can't be set to OFF or Silence.

The eight WAV slots correspond to the x.0 positions of the WaveScan parameter on the upper page: WAV 1 = position 1.0, WAV 2 = position 2.0, etc. A WaveScan value of 1.5, for example, is derived by "morphing" halfway between WAV 1 and WAV 2.

Two additional features make waveform selection and auditioning very easy:

- Press the corresponding Control button to audition that WAV position in isolation.
- Hold [SHIFT] and turn a Control knob to change that waveform and all that follow it. For example,
  - Hold [SHIFT] and turn Control knob 3.
  - As WAV 3 selects waveform X, WAV 4 selects waveform X+1, WAV 5 selects waveform X+2, etc.

When a WAV is set to OFF, any WAV after it is treated as if it were located in an earlier position. For example, if WAV 7 = OFF but WAV 8 = Pulse4, the Hydrasynth handles Pulse4 as if it were WAV 7.

Oscillator Bit Reduction

Bit reduction degrades a digital signal by reducing its resolution. At its most extreme settings the original sound is unrecognizable. It's like a pixelated photograph for the ears!

The Hydrasynth oscillator resolution can be reduced gradually to 2 bits, with many intermediate values. This can be done independently for each oscillator, but let's try a simple example using only Oscillator 1. Starting in Single mode:

1. Initialize the patch by pressing [INIT] twice.
2. Press [OSC 1] to access its module.
3. Use Control knob 2 to set the Wave to Triangle.

4. Hold a low note and use Control knob 7 to audition the BitRedux settings.
5. Note how the sound first becomes 'crispy', and then gradually degrades as the value approaches 2 bits.
6. Experiment with different waveforms and BitRedux values. Every combination has its own character!

BitRedux includes standard binary values such as 16-, 8-, 4-, and 2 bits. But there are timbres ranging from the beautiful to the malevolent lurking in less-explored bit depths of 10, 7, and 3, etc. Try it on your favorite patch: Apply BitRedux to one or more oscillators, and see what happens!

Oscillator 3

Oscillator 3 operates in only one mode (Single), so it does not have the Mode select option in edit field 1. See the description of this mode in *Oscillators 1 and 2 (p. 41)*.

While creating a patch it can be useful to solo an oscillator to see what it is contributing to the sound. This feature is located on the first page of the *The Mixer Module (p. 49)*. Ring & Noise can also be soloed.

Mutants 1–4

Each of the Mutant modules is identical so we will describe them all at the same time. They are arranged in pairs: two for Oscillator 1 and two for Oscillator 2. Depending on the selected mode, the output of one of the Mutants in a pair can be fed into the next Mutant and/or into any other Mutant, including itself. In some modes the Mutants are dedicated to the oscillators with which they are paired.

The first edit field of the Mutant module selects the mode. There are eight:

Mode	Description
FM-Lin	Modulate the oscillator frequency with the selected Source
WavStack	Adds phase-shifted copies of the waveform; simulates many oscillators using only one
OSC Sync	Force the harmonics of the oscillator to synchronize with those of the selected Source
PW-Orig	Classic method of adjusting the pulse width of a waveform
PW-Sqeez	Time-compressed pulse width modulation method
PW-ASM	Customizable pulse width modulation via FM; targets specific sections of the waveform
Harmonic	Emphasizes individual harmonics in the waveform, de-emphasizes all others
PhazDiff	Generates the difference of the source wave and an inverted, phase-shifted copy

FM-Lin

This module provides a type of synthesis known as Linear FM (Frequency Modulation). Each voice is the equivalent of a 2-operator stack, with a carrier and a modulator. Unlike the most famous synth of the mid-1980s, which used only sine waves, the Hydrasynth can use any of its 219 waveforms as both the carrier and the modulator. The FM Source can also be generated by the Mutant itself (Sine or Triangle), another Mutant module, or the CV inputs (Mod In 1 or Mod In 2).

FM-Lin parameter	Range	Description
Source	Sine, Triangle, Osc 1-3, Ring Mod, Noise, Mutant 1-4, Mod In 1, Mod In 2	Selects the FM source
Ratio [1]	0.250-64.000 in varying increments	Relative tuning of Source & oscillator (Source = Sine or Triangle only). Hold [SHIFT] to jump by harmonics.
Depth	0-128 in increments of 0.1	FM input level to the oscillator
Feedback	0-150%	Feeds the FM output back into itself
Dry/Wet	0-100%	Oscillator/Mutant blend; 100% = pure Mutant

[1] The Ratio parameter is only visible when Source = Sine or Triangle.

Mod In 1 and 2 can process audio-rate input frequencies, so it's possible to use an instrument or an audio feed as an FM source in the Mutant module. Note that this works best with mono mode. It is not possible to dissect polyphonic audio and assign each part to individual voices.

WavStack

This mode stacks five detuned copies of the waveform on top of itself, which makes for a fat sound using only a single oscillator. Pro tip: Spreading out multiple voices with the StereoWidth parameter ([VOICE] page 1) can make the sound HUGE.

Depth controls the amount of detuning between each of the five copies. **Dry/Wet** adjusts the balance between the unprocessed input and the mutated output.

OSC Sync

Oscillator Sync is a classic analog synthesizer technique where an oscillator is forced to align its harmonics with another oscillator. Traditionally this is done with simple waveforms, and with the second oscillator affecting the first. Hydrasynth provides many more options, including the use of all 219 waveforms in either position, the ability to sync Osc 1 and/or Osc 2, and the ability for any of the three oscillators to be used as the sync source.

OSC Sync parameter	Range	Description
Source	Osc 1, Osc 2, Osc 3	Select sync source.
Ratio	0.250-64.000 in varying increments	How many times the wave will resync in a single cycle. Hold [SHIFT] to jump in whole numbers.
Depth	0-128 in increments of 0.1	Controls the strength of the sync effect
Window	0-128 in increments of ~0.1	Applies Hann window to sync source
Feedback	0-150%	Feeds the sync output back into itself
Dry/Wet	0-100%	Mix raw waveform + sync result; 100% = pure Mutant

The Ratio parameter is unusual for oscillator sync. Normally the sync operates at a 1:1 ratio: the synced oscillator conforms to a single cycle of the host waveform, and that's that. But the Ratio parameter sets the number of times the oscillator will resync within that single cycle. See the next section for a more complete explanation.

About Ratio

The Ratio parameter is part of what makes the Hydrasynth voice engine unique. It gives you control over how many times PWM or Oscillator Sync happens during a single waveform cycle, instead of happening only once per cycle as with other synthesizers. It may help to think of it like this:

- At 1:1 there is one process for one cycle of the wave.
- At 2:1 there are two processes for one cycle of the wave.

So at 2:1 the PWM happens twice in a cycle instead of once (the way "normal" PWM does); the Oscillator Sync happens twice in the cycle.

The ratio can be as high as 64:1 or as low as 0.250:1. This means that the mutation process can occur as many as 64 times in the space of one waveform cycle, or as few as one time in the space of *four* waveform cycles.

Window

A Hann window applies a sort of "bell curve" filter to the Osc Sync source. It rolls off the high and low input frequencies at ~18dB / octave, which can help tame any harshness in the output.

Pulse Width modulation

Pulse Width Modulation (PWM) alters the basic shape of the waveform by shifting its internal structure over time, making some areas narrower and others wider. This is normally only heard with square waves, but the Hydrasynth voice engine can apply PWM to any of its 219 waveforms.

And there's more! Hydrasynth takes PWM in entirely new directions by providing not one, but *three* types of PWM. Each has the same parameters (with one exception as noted below), but the results of each type can be radically different!

PWM parameter	Range	Description
Ratio	0.250-64.000 in varying increments	How many times PWM happens in a single cycle. Hold [SHIFT] to jump by whole numbers.
Depth	0-128 in increments of 0.1	Controls harmonic range of PWM
Feedback	0-150%	Feeds the PWM output back into itself
Custom Edit (PW-ASM only)	(access)	Press Control button 7 to access Warp points. (See PW-ASM [Warp] section.)
Dry/Wet	0-100%	Mix raw waveform + PWM result; 100% = pure Mutant

PW-Orig

This is the "vintage" PWM used by many analog polysynths in the '70s and '80s: a waveform is fixed at its center and both of its edges are moved to compress or expand its width. The PWM source is often an LFO, though an Envelope or other sources can yield excellent results.

PW-Sqeez

This form of Pulse Width modulation grabs the start and end points of the modulation and then squeezes them to the right. It might help to think of this as "time-warping" a waveform: It makes the oscillator go slow at first and then go fast, all in the space of a single cycle.

PW-ASM [Warp]

PW-ASM mode divides the selected waveform into 8 sections that are framed by Warp points. The values chosen for each Warp point determine how warped each section of the waveform can become.

Here's an example of PW-ASM mode in action.

1. Start in Single mode with an initialized patch (press [INIT] twice).
2. Access [OSC 1] and select the sine wave.
3. Access [MUTANT 1] and select PW-ASM mode.
4. Set Mutant 1 Depth to 128.0 and Dry/Wet to 100%.

5. Press Control button 7 to access Custom Edit.
6. Hold a note and turn Control knob 2 slowly.
7. Listen and watch the display as Warp2 changes from 0 to 128 and back. Note how the waveform is affected only in one specific area (i.e., Warp point 2).
8. Repeat steps 6 and 7 with one or more Warp points at various values.
9. Also try different settings for Ratio, Feedback, and Dry/Wet. The sonic potential is nearly limitless.

PW-ASM mode is actually a form of Frequency Modulation (FM). It allows you to draw your own modulator waveform by selecting different values for each of the 8 Warp points. Construct a slope, a valley, a mound, jagged peaks, pseudo-random, etc.; your design will become an FM source (i.e., the modulator).

Each Warp point can be a destination in the Mod Matrix, so timbral changes can be as subtle or wild as you like. For example, use synced LFOs as mod sources and various Warp points as destinations.

Harmonic

At its maximum Depth and impact (100% wet) the Harmonic mutator emphasizes individual harmonics in a waveform and de-emphasizes the others. Its effect is heard more obviously on waveforms rich in harmonics, like a sawtooth wave, than on a simpler waveform such as a sine wave.

Harmonic parameter	Range	Description
Ratio	0.250-64.000 in varying increments	Selects initial harmonic for emphasis. Hold [SHIFT] to jump by harmonics.
Depth	0-128 in increments of 0.1	Controls harmonic range
Feedback	0-150%	Feeds the harmonic output back into itself; can tame effect due to phase cancellation
Dry/Wet	0-100%	Mix raw waveform + harmonic; 100% = pure Mutant

Try this experiment to see how the Harmonic mutator affects different waveforms:

1. Initialize a Single mode patch by pressing [INIT] twice. This provides a saw wave from Oscillator 1.
2. Access [MUTANT 1] and turn Control knob 1 to select the Harmonic mode.
3. Set the Depth parameter to 0.0.
4. Set the Dry/Wet parameter to 100% so only the effect will be heard.
5. Hold the second-lowest C until step 8. You should hear almost nothing at this point.
6. Slowly increase the Depth to 128. Each of the frequencies in the harmonic series is emphasized.
7. Return the Depth slowly to 0. Gradually all harmonics disappear, even the fundamental.
8. Release the note.
9. Access [OSC 1] and change the Wave to Square.
10. Access [MUTANT 1] and repeat steps 5-8. You will hear a limited set of harmonics emphasized.

Here's why they were different: As the depth increased the Harmonic effect revealed the harmonics that are present in each waveform. A sawtooth wave contains all harmonics, but a square wave contains only odd-numbered harmonics.

Try the experiment with other waveforms. It's a good way to learn why the various waveforms sound different: each contains a different set of harmonics in varying strengths.

PhazDiff

PhazDiff generates the difference of the incoming wave and a version that is inverted and phase-shifted.

Parameter	Range	Description
Depth	0-128 in increments of 0.1	Controls the phase of the output waveform
Feedback	0-150%	Feeds the phase-shifted output back into itself
Dry/Wet	0-100%	Mix raw and phase-shifted waveforms; 100% = pure Mutant

Here's how to explore this Mutant. But be careful with high Feedback values in step 5! The results can be very loud.

1. Initialize a Single mode patch by pressing [INIT] twice.
2. Press [MUTANT 1] to access that Mutant module.
3. Use Control knob 1 to select the PhazDiff mode.
4. Use Control knob 8 to set the Dry/Wet control to 50%. This provides an equal blend of the raw wave and its mutation.
5. Experiment with different values of Depth and Feedback to hear what they do.
6. Try step 5 with other waveforms, and try different Dry/Wet values.

This is especially fun to watch in the display as the waveform peaks are shifted and inverted. The changes are easier to see with simpler waveforms such as Horizon5 or Spect A1, but the results are always audible. Modulating the Depth via the Mod Matrix is a great way to introduce subtle shifts in the sonic landscape, too.

Ring-Noise Module

This module contains two additional sound sources that can be blended with the oscillators to make sounds that are even more interesting.

Ring Modulation (Ring Mod or RM) takes two audio signals and generates a sound based on the sum and the difference of their frequency content. Depending on the sources the result can be bell-like and pure, or it can be wiry, robotic, trashy, and/or pleasingly unnatural.

A noise generator produces random, simultaneous frequencies across a broad range. The different colors represent specific frequency ranges and power levels.

Parameter	Pertains to...	Range	Description
Source 1	RM	Osc 1-3, Noise, Mutant 1-4, Mod In 1, Mod In 2	Select the first input source
Source 2	RM	Same as Source 1	Select the second input source
RM Depth	RM	0-128 in increments of 0.1	Depth of Ring Modulation
Ring Vol	RM	0-128 in increments of 0.1	RM volume. Parameter is shared with Mixer page 1, edit field 5; changing one also changes the other.
Noise Type	Noise	White, Pink, Brown, Red, Blue, Violet, Grey	Select the noise type
Noise Vol	Noise	0-128 in increments of 0.1	Noise volume. Parameter is shared with Mixer page 1, edit field 6; changing one also changes the other.

Mod In 1 and 2 can process audio-rate input frequencies, so it's possible to use an instrument or an audio feed as an input source for the ring modulator. Note that this works best with mono mode. It is not possible to dissect polyphonic audio and assign each part to individual voices.

Waveform List

Waveform group	Waveforms
Classic	Sine, Triangle, TriSaw, Saw, Square
Pulse	Pulse 1-6
Horizon	Horizon 1-8
SyncLav	SyncLav 1-5
Esquire	Esquire 1-4
ChriMey	ChriMey 1-6
Spect A	Spect A 1-7
Spect X	Spect X 1-7
Klangor	Klangor 1-5
Induct	Induct 1-3
Scorpio	Scorpio 1-9
Belview	Belview 1-5
Chendom	Chendom 1-8
Glefan	Glefan 1-7
Sqarbel	Sqarbel 1-2
Obob	Obob 1-3
Ingvay	Ingvay 1-3

Waveform group	Waveforms
Particl	Particl 1-3
Vokz	Vokz 1-6
Flux	Flux 1-5
Alweg	Alweg 1-8
Tronic	Tronic 1-6
Duotone	Duotone 1-6
Bobanab	Bobanab 1-4
Melotic	Melotic 1-7
Cluster	Cluster 1-8
Micoten	Micoten 1-5
Orland	Orland 1-8
Neuton	Neuton 1-7
Xfer	Xfer 1-7
Resyn	Resyn 1-4
Sano	Sano 1-4
SquRoo	SquRoo 1-15
Harmon	Harmon 1-23

This module has three pages with a few simple but important functions. We'll refer to the oscillators, Ring modulator, and Noise generator as "the sources" to make the information easier to read.

Page	Feature	Range	Description
1	Source Level	0.0-128.0	Individual levels for Osc 1-3, Ring modulator, and Noise generator
1	Solo	On/Off	First press: all 5 sources are active. Use Control buttons to solo a source.
2	Source Pan	-/+ 64.0	Pan controls for Oscillators 1-3
2	Filter Ratio	100:0 - 0:100	Ratio of Oscillators 1-3 fed to the two filters
3	Source Pan	-/+ 64.0	Pan controls for Ring modulator and Noise generator
3	Filter Ratio	100:0 - 0:100	Ratio of Ring modulator / Noise generator fed to the two filters
3	Filter Routing	Series, Parallel	Places the filters in Series or Parallel configuration.

Setting Levels

To set the relative levels of the sources, access [MIXER]. The first page is selected automatically. In the top row are the levels for Oscillators 1-3, while the levels for Ring and Noise are on the bottom row. Use the appropriate Control knob to adjust the level of each item, and use [SHIFT] + Control knob X to fine-tune the level.

The Solo Function

When creating a patch you may want to hear one of the sources on its own while making adjustments to that source. Rather than setting the other levels to zero temporarily and restoring them later, Hydrasynth Deluxe includes a Solo function.

It's easy to use:

- Press Control button 8 to toggle Solo from Off to On. The Control buttons for all 5 sources will light, which means they are still active.
- Press the Control button of the source you want to hear. Its Control button will become brighter than the others.
- Press another Control button to solo that source. The first Control button will dim and the selected one will brighten.
- Press Control button 8 again to defeat the Solo function.

Set the Pan Positions

Osc 1-3 Pan

To set the stereo placement of the oscillators, access [MIXER] and use the Page Down arrow to select page 2. In the top row are the pan positions for Oscillators 1-3. Use the appropriate Control knob to adjust the pan position of each item, and use [SHIFT] + Control knob X to fine-tune the value.

Ring + Noise Pan

To set the stereo placement of the Ring modulator and Noise generator, access [MIXER] and press the Page Down arrow twice to select page 3. In the top row are the parameters Ring Pan and Noiz Pan. Use the appropriate Control knob to adjust the pan position of each item, and use [SHIFT] + Control knob X to fine-tune the value.

Filter Routing of Sources

Osc 1-3 Filter routing

To adjust the routing of each oscillator between Filter 1 and Filter 2, access [MIXER] and use the Page Down arrow to select page 2. In the bottom row are the filter routing values for Oscillators 1-3. Use the appropriate Control knob to adjust the filter routing of each item:

- 100:0 sends the source only to Filter 1.
- 0:100 sends the source only to Filter 2.
- Intermediate values send the source to both filters in varying amounts.

Use [SHIFT] + Control knob X to fine-tune the values.

Ring + Noise Filter routing

To adjust the routing of the Ring modulator and Noise generator between Filter 1 and Filter 2, access [MIXER] and press the Page Down arrow twice to select page 3. In the bottom row are the filter routing parameters RingFilt and NoizFilt. Use the appropriate Control knob to adjust the filter routing of each item:

- 100:0 sends the source only to Filter 1.
- 0:100 sends the source only to Filter 2.
- Intermediate values send the source to both filters in varying amounts.

Use [SHIFT] + Control knob X to fine-tune the values.

Filter Configuration

This setting specifies whether the filters operate in Series or Parallel mode. When they are in Series, Filter 1 always passes through Filter 2. When they are in Parallel, sources can be routed so they pass through only one of the filters or through both filters in varying amounts (as described above in *Filter Routing of Sources (p. 50)*).

The setting is linked to Filter 1 page 2, edit field 1; changing one also changes the other.

Filters are second only to oscillators in defining the sound of a patch. If the oscillators were passengers in a car, for example, then the filters are the doors: Some open and close luxuriously to reveal the occupants; others have more grit and meet a different need. The Hydrasynth Deluxe filters cover the range from a silky Lamborghini to a rugged Jeep, with all the sophistication and aggression implied by those extremes. You're ready for any sort of musical journey with Hydrasynth Deluxe.

There are two filters available, each with its own characteristics. They can be used in series, with Filter 1 feeding Filter 2, or used in parallel, where each filter has a direct path to the output.

Filter 1

This filter is actually a collection of filter types. Each one has its own character, and some may be similar to analog filters you have encountered. But we didn't want Hydrasynth Deluxe to sound like a clone of any instrument, so we took some of the flavor of the original filters and made something new. As with the oscillators, you will find that the Hydrasynth Deluxe filters add their own signature to the sound.

Filter 1 types

Name	Description
LP Ldr12	12dB Uncompensated Ladder filter
LP Ldr24	24dB Uncompensated Ladder filter
LP Fat12	12dB Compensated Ladder filter
LP Fat24	24dB Compensated Ladder filter
LP Gate	Low Pass Gate filter
LP MS20	Low Pass filter with an MS-20 flair
HP MS20	High Pass filter with an MS-20 flair
LP 3-Ler	The Low Pass flavor of a boutique modular synth
BP 3-Ler	The Band Pass flavor of a boutique modular synth

Name	Description
HP 3-Ler	The High Pass flavor of a boutique modular synth
LP Stn12	Our version of a popular 12dB Low Pass filter
BP Stn12	Our version of a popular 12dB Band Pass filter with dual 6dB slopes
HP Stn12	Our version of a popular 12dB High Pass filter
LP 1 Pole	A gentle 6dB Low Pass filter
LP 8 Pole	A steep 48dB Low Pass filter
Vowel	Vocal formant filter

Compensated vs. Uncompensated filters

Filter compensation could be an unfamiliar concept. It's another way in which ASM has adapted the sonic profile of various analog synthesizers. Here's the difference:

- Uncompensated filters: As resonance increases the low frequency content of the sound is reduced.
- Compensated filters: The bass response is *not* reduced as resonance is increased.

Filter 1 parameters: page 1

All of the Filter 1 types have the same parameters, with one exception as noted. Access [FILTER 1] and turn Control knob 1 to select the Type, then adjust these parameters as needed:

Control knob	Parameter	Range	Description
2	Control (type = Vowel only)	0.0-128.0	Formant control
3	Cutoff	0.0-128.0	Cutoff frequency for most; vowel control for Vowel filter
4	Resonance	0.0-128.0	Controls resonance or Q
5	ENV 1 amount	+/- 64.0	Sets amount & polarity of Envelope 1 effect on filter
6	LFO 1 amount	+/- 64.0	Sets amount & polarity of LFO 1 effect on filter
7	Vel Env	+/- 64.0	Allows velocity to set maximum range of filter envelope
8	Keytrack	+/- 200%	Scales filter response across keyboard; C2 = center note

Control

This parameter is visible only when the Filter type is set to Vowel. It provides control over location and spread of the formants, which are certain peaks and nodes in the filter frequencies that help to approximate the resonance of the human vocal apparatus. Use this with the Cutoff, Resonance, and Vowel Order parameters for greater precision.

Cutoff

This controls the Cutoff frequency for every filter type except the Vowel filter, for which it becomes the vowel control. When Filter 1 is selected on the top panel, the Cutoff knob also controls this parameter.

Resonance

This adjusts the resonance of the filter. When Filter 1 is selected on the top panel, the Resonance knob in the Filter Controls section also controls this parameter.

ENV 1 amount

This parameter defines the amount and polarity of the effect Envelope 1 will have on Filter 1. When Filter 1 is selected on the top panel, the ENV 1 knob in the Filter Controls section also controls this parameter.

There's a similar, separate parameter for Filter 2.

Envelope 1 has a pre-wired connection to the Filter section, which saves a mod route. But a different envelope can be used to control the filter if you want; just set this value to 0 and create a new route via *The Mod Matrix (p. 90).*

LFO 1 amount

This parameter defines the amount and polarity of the effect LFO 1 will have on Filter 1. When Filter 1 is selected on the top panel, the LFO 1 knob in the Filter Controls section also controls this parameter.

There's a similar, separate parameter for Filter 2.

LFO 1 has a pre-wired connection to the Filter section, which saves a mod route. But a different LFO can be used to control the filter if you want; just set this value to 0 and create a new route via *The Mod Matrix (p. 90)*.

Vel Env

This is an abbreviation for "Velocity to Envelope". It adjusts the depth of the filter envelope based on note velocity: notes played at maximum velocity allow Envelope 1 to have maximum impact on the filter frequency, within the range set by the Env 1 amount parameter. It can be set negatively, so that higher velocities reduce the range of a positive-going filter envelope or increase the range of a negative-going filter envelope.

There is a similar, separate parameter for Filter 2.

Vel Env operates within the range set by the Env 1 Amount parameter; if you have no envelope amount set, the parameter will do nothing.

Keytrack

This parameter scales the filter response across the keyboard, with C2 as the center note. A positive value means that notes above the center note increase the filter cutoff frequency, and notes below the center note *decrease* the filter cutoff frequency. A negative value means that notes above the center note decrease the filter cutoff frequency, and notes below the center note *increase* the filter cutoff frequency. There is a similar, separate parameter for Filter 2.

Filter 1 parameters: page 2

Control knob	Parameter	Range	Description
1	Filter Route	Series, Parallel	Places the filters in Series or Parallel configuration.
2	(blank)	-	-
3	Drive	0.0-128.0	Drive amount
4	Drive Route	Pre, Post	Drive placement in signal path
5	Vow Order (type = Vowel only)	8 orders	Changes formant order during frequency sweeps

Filter Route

This setting specifies whether the filters operate in Series or Parallel mode. When they are in Series, Filter 1 always passes through Filter 2. When they are in Parallel, sources can be routed so they pass through only one of the filters or through both filters in varying amounts (as described in *Filter Routing of Sources (p. 50)*).

The setting is linked to the parameter on Mixer page 3, edit field 4; changing one also changes the other.

Drive

To add extra warmth or grit to a patch, try adjusting the Drive parameter. As the value climbs the waveform begins to clip, and at the highest settings the waveform can be radically distorted. The Drive route setting determines the point at which the overdrive is applied (see below).

When Filter 1 is selected on the top panel, the the Drive parameter is shared with the Drive / Morph knob in the Filter Controls section.

Drive Route

There are two configurations for routing the Drive effect: Pre or Post. The difference is whether the waveform is boosted before it hits the filter or whether the filter output is boosted before it reaches the Amp stage.

- **Pre** places the Drive effect between the waveform and the filter.
- **Post** places the Drive effect after the filter.

Vowel Order

This parameter is only visible when the Vowel filter type is selected. It provides eight different arrangements of the vocal formants, ranging from AEIOU to UIEAO. Combined with creative use of the Cutoff and Resonance parameters, nearly any vowel or diphthong can be achieved.

Filter 2

Filter 2 is our adaptation of a classic 2-pole state-variable filter. True to form, Filter 2 can toggle between two filter types: Low Pass / Band Pass / High Pass, and Low Pass / Notch / High Pass. Each provides a perfect complement to Filter 1.

The filters can be used in Series or Parallel.
This setting is found on page 2 of Filter 1.

Filter 2 parameters

Control knob	Parameter	Range	Description
1	Type	LP-BP-HP, LP-NO-HP	Selects filter type
2	Morph	0.0-128.0	Adjusts filter: 0 = LP, 64 = BP or NO, 128 = HP, with gradual changes
3	Cutoff	0.0-128.0	Cutoff frequency
4	Resonance	0.0-128.0	Controls resonance or Q
5	ENV 1 amount	+/- 64.0	Sets amount and polarity of Envelope 1 effect on filter
6	LFO 1 amount	+/- 64.0	Sets amount and polarity of LFO 1 effect on filter
7	Vel Env	+/- 64.0	Allows velocity to set maximum range of filter envelope
8	Keytrack	+/- 200%	Scales filter response across keyboard; C2 = center note

Filter 2 Types

Filter 2 provides two filter types, each with Low Pass and High Pass modes to process the high and low frequencies. The major difference is what happens in the middle, as Morph approaches a value of 64:

- Band Pass emphasizes the middle frequencies, in a range defined by the Resonance setting.
- Notch reduces the middle frequencies, in a range defined by the Resonance setting.

The differences are more pronounced with higher resonance values. You'll also notice that the Band Pass and Notch filters affect the Low Pass and High Pass modes differently as you sweep the filter frequency. Between these two filter types the Hydrasynth Deluxe can achieve an astonishing variety of sounds.

Morph

This parameter adjusts the filter between its various states, with a Low Pass filter at one extreme, a High Pass filter at the other, and a Band Pass or Notch filter at the middle setting. Along the way there are hundreds of intermediate settings. As the value changes, a graphic indicates the filter character.

When Filter 2 is selected on the top panel, the Morph parameter is shared with the Drive / Morph knob in the Filter Controls section.

The rest of the Page 1 parameters are identical in function to the same parameters in Filter 1 (Cutoff, Resonance, ENV 1 amount, LFO 1 amount, Velocity, and Keytrack). Please refer to *Filter 1 parameters: page 1 (p. 51)* for their descriptions.

Set up mod routes quickly from an Envelope or LFO to the Filter: Hold the module button for the desired source, then press the module button for the destination.

The Amp module is relatively simple, and has only three parameters.

Control knob	Parameter	Range	Description
6	LFO 2 amount	+/- 64.0	Sets amount and polarity of LFO 2 amplitude modulation
7	Velocity	+/- 64.0	Adjusts amplitude velocity response
8	Amp Level	0.0-128.0	Controls pre-FX level of patch

How the Parameters Interact

All three of the parameters in the Amp module work together. The LFO 2 amount and Velocity parameters operate within the limits set by the Amp Level setting.

LFO 2 Amount

This parameter adjusts the amount and polarity of the effect LFO 2 has on the Amplitude of the patch. It uses the current value of the Amp Level parameter as its starting point.

A negative value for LFO 2 Amount literally inverts the phase of the LFO waveform. For example, if the LFO 2 wave is set to Saw Up, it will behave like a Saw Down wave when the LFO 2 Amount is set to a negative value.

The Amp Level setting also sets the upper limit of the amplitude modulation. In other words, a bi-polar LFO waveform will not cause the amplitude of the patch to rise higher than the Amp Level value. This helps prevent unwanted clipping of the signal as it heads into the Effects section.

Velocity

The Velocity parameter determines how much the amplitude stage will respond to note velocity. Negative values invert the response, so that an increase in velocity reduces the amplitude.

When Velocity is set to 0 there will be no velocity response at the amplitude stage. However, other parameters might still respond to velocity, depending on the settings in the Mod Matrix and elsewhere in the signal path.

As the Velocity value is increased the amplitude will *decrease* if a note is played at less than maximum velocity. What the Velocity parameter does is create "headroom" for the velocity-to-amplitude response.

In other words, the Amp Level parameter sets the upper limit for the velocity response. That way a note cannot push the amplitude of the patch higher than the Amp Level value. This helps prevent unwanted clipping of the signal as it heads into the Effects section.

Amp Level

The Amp Level parameter is the boss, or at least "middle management"; it sets the maximum output level for the signal path before it heads into the Effects section. This helps prevent a situation that could cause the Amp Level output to exceed a value of 128 and cause clipping in the Effects.

Another way to think of the Amp Level parameter is that it can be used to compensate for quieter or louder output from the oscillators and filters.

What's an Envelope?

An envelope defines the shape of a modulation: how it begins, how it ends, and how big it will be in the middle. Hydrasynth Deluxe has 5 envelopes that can be used to shape any available parameter through the Mod Matrix. All 5 have identical parameters, so every description applies equally to all.

Envelope features

ADSR plus

A Hydrasynth Deluxe envelope provides the classic ADSR form factor (Attack, Decay, Sustain, and Release). But they've been enhanced with delay and hold stages, so technically the form factor is DAHDSR.

Adjustable curves

The Attack, Decay, and Release segments have curves that can be adjusted gradually from Logarithmic to Linear to Exponential. They can be snappy, lazy, or anything in-between. This allows you to specify exactly how you want the patch to proceed from start to finish.

Time-based segments

Envelopes can operate in one of two modes: synchronized or unsynchronized. If the BPM Sync option is On each segment can occupy a specific rhythmic value. If the BPM Sync option is Off the duration of each segment is measured in seconds (or milliseconds). Every envelope and segment will last exactly as long as you want.

Note that the BPM Sync setting affects all stages except Sustain, which is merely a level (i.e., a place, not an event).

The wonderful thing about triggers

Hydrasynth Deluxe envelopes can be triggered by as many as four sources once a voice is active. Once it is triggered an envelope can run freely (Freerun: On), reset with each new note (Reset: On), or reset only if all other notes have been released (Legato: On).

It's easier to hear an envelope reset with a monophonic patch than with a polyphonic patch. For an example see the description of *Reset (p. 59)*.

Looping envelopes

Hydrasynth Deluxe envelopes can loop a specific number of times or indefinitely.

Modulation and interaction

An envelope can be used as a modulation source for any destination, and individual envelope segments can be modulated (shortened or lengthened) by LFOs or by other envelopes.

Thanks to the Mod Matrix, envelopes and LFOs can interact and evolve in a nearly infinite number of ways. For a quick tip on how to do this, see *Envelope Shortcuts (p. 60)* at the end of this chapter.

Envelopes 1 and 2

Hydrasynth Deluxe has pre-wired connections linking ENV 1 to the Filters and ENV 2 to the Amp module. This is because every sound has amplitude and timbre, even if a distinct pitch is not present. More envelopes can be routed to these destinations as needed through *The Mod Matrix (p. 90)*.

Envelope parameters: page 1

Control knob	Parameter	Range	Description
1	Attack	BPM = Off: 0 ms to 36.0 seconds BPM = On: 0, 1/64T to 64' (16 measures)	After the delay period, this is the length of time the envelope takes to reach its full amplitude.
2	Decay	BPM = Off: 0 ms to 60.0 seconds BPM = On: 0, 1/64T to 64' (16 measures)	After the hold period, this is the length of time the envelope takes to reach its sustain level.
3	Sustain	0.0 to 128.0	The resting level of the envelope prior to note off
4	Release	BPM = Off: 0 ms to 60.0 seconds BPM = On: 0, 1/64T to 64' (16 measures)	The length of time the envelope takes to reach its zero point after note off
5	Delay	BPM = Off: 0 ms to 32.0 seconds BPM = On: 0, 1/64T to 64' (16 measures)	The length of time before the attack segment begins
6	Hold	BPM = Off: 0 ms to 36.0 seconds BPM = On: 0, 1/64T to 64' (16 measures)	The length of time between the attack and decay segments
7	Quantize	(various)	Reduces envelope resolution
8	BPM Sync	Off, On	Toggles all envelope segments from seconds to synchronized time divisions.

To set the length of an envelope segment quickly: While on page 1, hold [SHIFT] and press the appropriate Control button for the desired length of time. This works with BPM On or Off.

Envelope Quantize

The Quantize option can add a stepped effect to the Envelope output. For example, it can make a complex attack very easily.

1. Press [INIT] twice.
2. Set the CUTOFF knob to minimum and the ENV 1 knob to maximum.
3. Press [ENV 1] and use Control knob 1 to set the Attack to 272 ms.
4. Play a midrange note below middle C. You'll hear a basic brass sound.
5. Use Control knob 7 to set the Quantize to 9.
6. Play the same note and listen to its attack. It has a bit of "spit", like a real trombone.
7. Use Control knob 1 to set the Attack to 1.53 seconds.
8. Hold the note and listen. The quantized attack is easier to hear.
9. Try different Quantize values. OFF is smooth; other values have steps.

BPM Sync settings

When the BPM Sync parameter is set to On, all of the segments with durations are measured in rhythmic values. This includes the Delay, Attack, Hold, Decay, and Release stages of the envelope. A duration can be set to 0, which means it happens instantly and therefore has no rhythmic value.

All other settings have a quantized duration ranging from 1/64T (a sixty-fourth note triplet) to 64' (64 quarter notes, or 16 measures in 4/4 time). Dotted values are also available. The chart below contains examples of how the values are shown:

Value	Duration
1/16	Sixteenth note
1/16Dot	Dotted sixteenth note
1/16T	Sixteenth note triplet
1/1	Whole note, or one measure
8'	Eight quarter notes, or two measures
64'	Sixty-four quarter notes, or sixteen measures

Envelope parameters: page 2

Control knob	Parameter	Range	Description
1	AtkCurve	Exp (-64) > Lin (0) > Log (64)	Defines the curve for the attack segment.
2	DecCurve	Log (-64) > Lin (0) > Exp (64)	Defines the curve for the decay segment.
3	(blank)	-	-
4	RelCurve	Log (-64) > Lin (0) > Exp (64)	Defines the curve for the release segment.
5	Legato [1]	Off, On	When On, an envelope won't reset unless all notes have been released.
6	Reset	Off, On	When On, an envelope is reset when polyphony is exceeded. If Legato = On, Reset is not available.
7	Freerun	Off, On	When On, an envelope will always run from Delay to the Sustain stage (note held) or from Delay through the Release stage (note released).
8	Env Loop	Off, 2-50, Infinite	Toggles the looping feature and defines the number of times the envelope will loop.

[1] The Legato parameter is hidden when Voice mode = Poly.

Envelope curves

Adjacent logarithmic curves look like a mound: The attack segment rises quickly and its rate of change slows as it nears the peak; the decay and release segments start falling slowly and accelerate until they reach the resting state.

Exponential curves are the opposite of logarithmic curves: The attack segment starts rising slowly and accelerates upward; the decay and release segments start falling quickly and decelerate until they reach the resting state.

A linear curve rises and falls at the same rate throughout its duration. However, linear changes seem less natural or "musical" to the human ear than the other curves.

Legato

When sheet music uses the term "Legato" it means to play a passage smoothly, with no rests between the notes. Likewise, when this parameter is set to On, the envelope will not retrigger if previous voice has not been released. This allows a filter envelope to remain at its sustain stage when a series of notes are played, for example, which can help a solo or a bass line to be more expressive.

Reset

The Reset parameter is only available when Legato is Off. When Reset is On an envelope will reset when a new note is played, even if the previous note has not been released.

The difference between Reset On and Off is easy to hear with a monophonic patch. But with a polyphonic patch the behavior is more obvious after the available polyphony has been exceeded. You'll need a sustain pedal for the following example.

1. **Set speaker/headphone levels low**; this could be loud.
2. Press [MULTI] to enter Multi mode
3. Press [INIT] twice to initialize the Multi
4. Turn the Balance knob to -64.0 (hard left). We'll hear the Lower part play voices 1-8 for this example.
5. Access [FILTER 1] and set Type to HP MS20
6. Set Cutoff to 50, Resonance to 100, and ENV1 amount to 64
7. Access [ENV 1]: set Attack and Decay to ~1 second, and set Sustain to ~64.
8. Hold down the sustain pedal
9. Play 7 notes on the lowest C
10. Wait for the filter to reach the sustain level for all 7 voices
11. Play the 8th note and listen as the filter sweeps through all frequencies
12. Wait until the filter stabilizes for voice 8, then play C again.
13. Listen as the filter sweeps from the sustain level, not the lowest frequencies.
14. Release the pedal.
15. Press the Page Down arrow and set Reset to On.
16. Repeat steps 8-14.
17. The difference: The filter sweeps through all frequencies for all notes, not just the first 8.

In summary, here's what to expect with a polyphonic patch:

- **Reset = On:** A retriggered voice starts the envelope from its beginning.
- **Reset = Off:** A retriggered voice starts the envelope from the sustain level.

Freerun

An envelope set to Freerun passes through all segments, even if the note is released before the end of the decay segment. If the note is held then the envelope proceeds to the sustain level and remains there until the note is released, after which the envelope proceeds through the release segment.

Envelope loop

This parameter enables an envelope to loop a specific number of times (between 2 and 50), and when set to Infinite it can loop forever. This means an envelope can even be used as a complex LFO (if 5 LFOs aren't enough!). The loop includes the attack, hold, and decay segments.

Envelope parameters: page 3

The most basic way to trigger and gate an envelope is to press and release a key. But once a voice is active, an envelope can be triggered by a variety of sources. And not just one source: Each envelope can have as many as four trigger sources.

Control	Parameter	Range
Knob 1	TrigSrc1	OFF [1], Note On, LFO 1-5, Rbn On, Rbn Release, SusPed On, Mod In 1, Mod in 2
Knob 2	TrigSrc2	OFF, Note On, LFO 1-5, Rbn On, Rbn Release, SusPed On, Mod In 1, Mod in 2
Knob 3	TrigSrc3	OFF, Note On, LFO 1-5, Rbn On, Rbn Release, SusPed On, Mod In 1, Mod in 2
Knob 4	TrigSrc4	OFF, Note On, LFO 1-5, Rbn On, Rbn Release, SusPed On, Mod In 1, Mod in 2
Button 5	Tap Trigger	Tap this button to trigger the envelope. The envelope does not sustain while the button is held.

[1] In order for audio output to be possible, TrigSrc1 of Envelope 2 is set to Note On and cannot be changed. All four TrigSrc values can be changed for the other envelopes.

Envelope Shortcuts

These are described in greater detail in other chapters, but they're so easy and useful we've included them here too.

Copy Env A to Env B

1. Hold [SAVE]
2. Press and release the source (Envelope A)
3. Press and release the destination (Envelope B)
4. Release [SAVE].

Create a direct Mod route

To set up a mod route to a specific parameter from inside a module:

1. Hold [ENV X] to select the source
2. Press the Control button for the desired destination parameter, then release both buttons
3. Those items appear in the first open Mod Matrix slot as the source and destination, respectively
4. Set the modulation amount with the lower Control knob.

What's an LFO?

LFO is an abbreviation for Low Frequency Oscillator. LFOs are the cause of familiar effects like vibrato and tremolo, but they can be used in very complex ways (as the presets will attest). Hydrasynth Deluxe has 5 LFOs that can modulate any available parameter through the Mod Matrix. All 5 have identical parameters, so every description applies equally to all.

LFO features

Hydrasynth Deluxe LFOs might be more flexible than any you have encountered. Here are some highlights:

- Delayed onset through the Delay and Fade-in parameters
- Adjustable phase: start the modulation from any point in the LFO waveform
- Synchronized or unsynchronized modes
- A wide range of rates, from slow to audio
- Independent LFO per voice
- LFOs can modulate themselves, each other, and/or anything else
- Trigger an LFO once or loop it indefinitely
- Design your own LFO, arpeggio, or mini-sequence with the Step LFO features

The Vibrato feature is a sixth LFO dedicated to the mod wheel. It is not available as a source or destination in the Mod Matrix. For details, see the *Vibrato settings (p. 75)* of the Voice module chapter.

LFOs 1 and 2

Hydrasynth Deluxe has pre-wired connections linking LFO 1 to the Filters and LFO 2 to the Amp module. More LFOs can be routed to these destinations through the *The Mod Matrix (p. 90)*.

LFO parameters: page 1

Parameter	Range	Description
Wave	Sine, Triangle, Saw Up, Saw Down, Square, Pulse27%, Pulse13%, S&H, Noise, Random, Step	Selects LFO waveform. "Step" is user-defined
Rate	BPM = Off: 0.02 to 150.0 Hz BPM = On: 64' to 1/64T	Sets duration of LFO cycle
BPM Sync	Off, On	Toggles LFO rate from Hz to synchronized time divisions
TrigSync	Poly, Single, Off	Poly: independent LFO per voice Single: One LFO affects all voices; each new note retriggers that LFO Off: One LFO affects all voices & runs freely
Delay	BPM = Off: 0 ms to 32.0 seconds BPM = On: 0, 1/64T to 64' (16 bars)	Length of time before LFO begins
Fade In	BPM = Off: 0 - 5943 ms BPM = On: 0, 1/64T to 64' (16 bars)	Length of time LFO takes to rise to maximum amplitude
Phase	0° - 360°	Defines starting point of LFO waveform
Level	0.0 - 128.0	Maximum amplitude of LFO

There's a quick way to set the LFO rate: While on page 1, hold [SHIFT] and then hold Control button 2 for the desired period of time. This works with BPM On or Off.

Some of those parameters may require additional explanation.

BPM Sync option

When the BPM Sync parameter is set to On the LFO rates are represented by rhythmic values. These range from 1/64T (a sixty-fourth note triplet) to 64' (64 quarter notes, or 16 measures in 4/4 time). Dotted values are also available. Here are some examples of how the values are shown:

Value	Duration
64'	Sixty-four quarter notes, or sixteen measures
8'	Eight quarter notes, or two measures
1/1	Whole note, or one measure
1/16Dot	Dotted sixteenth note
1/16	Sixteenth note
1/16T	Sixteenth note triplet

TrigSync

This parameter governs whether an LFO resets with each new note or operates independently per voice.

- **Poly:** Each new note triggers its LFO independently. Use this for lush pads, etc.
- **Single:** One LFO affects all voices; each new note retriggers that LFO.
- **Off:** The LFO runs freely and affects all voices. It could be anywhere in its cycle when it appears.

Phase

An LFO doesn't need to start at a zero-crossing point. This parameter allows you to specify the exact point at which it will begin, as measured in degrees from zero to 360.

Level

You may wonder why this parameter is needed, when the Mod Matrix allows you to set a level for each modulation route. That's a good question with a great answer.

For example, imagine that an LFO is routed to multiple destinations in the Mod Matrix (which is often the case). This parameter makes it possible to adjust all of those routes with a single edit, rather than needing to adjust each mod route separately. The LFO Level parameter is a fine-tune control that allows you to dial in a modulation amount with precision.

LFO parameters: page 2

Control knob	Parameter	Range	Description
1	Steps	2-64	Specific LFO points can be selected and defined
2	Smooth	0-127	Slows waveform changes [1]
3	Quantize	(various)	Reduces LFO resolution
4	One-Shot	Off, On, Step	On = LFO completes 1 cycle and stops , Step = advance LFO by one step per trigger [2]
7	SemiLock	Off, On	Displays steps in semitone amounts inside the Step Edit page
8	Step Edit..	(access)	Enters the Step Edit page

[1] When One-Shot = Step the Smooth setting has no effect. It is applied only when One-Shot = ON or OFF.

[2] The Step option is only visible when Wave = Step on page 1.

Three of those are hidden for most of the LFO waveforms, so we'll describe the others first.

Smooth

Also known as "slew", this parameter softens the transitions from one amplitude of an LFO to the next. When a waveform with abrupt changes is selected (Saw, Square, S&H, Step) the Smooth parameter makes the LFO "glide" between adjacent values. At the highest setting the square and triangle LFO waveforms are identical.

LFO Quantize

The Quantize option can add a stepped effect to the LFO output. For example, it can turn a sine wave into a complex LFO.

1. Press [INIT] twice.
2. Hold [LFO 1] and press [OSC 1] to create a mod route.
3. Set the mod depth to 120.0 with Control knob 6. Hold [SHIFT] to fine-tune the value.
4. Press [LFO 1] to access that module.
5. Use Control knob 2 to set Rate to 0.50 Hz.
6. Press the Page Down arrow to access page 2.
7. Hold a note and turn Control knob 3 slowly through the Quantize values.
8. When Quantize = 9 the LFO becomes a 2-octave diminished arpeggio.
9. Try other Quantize values, waveforms, and rates. The results can be very complex!

One-Shot

An LFO will run its course only once if this parameter is set to On. For example, it could:

- allow a single warble from a sine wave LFO
- give a short burst from the Noise waveform
- run the Step LFO sequence one time, etc.

When One-Shot = Step, the Step LFO sequence will advance by one step with each trigger.

"Step LFO sequence?" For an explanation of that, see the next section. To learn how One-Shot mode and Step LFOs work together, see *One-Shot LFOs: Step Advance (p. 64)*.

The Step LFO

The Step LFO lets you define up to 64 stages through which the LFO will pass. Its parameters are only available when the LFO Wave selection is set to Step. After that, three more parameters appear on Page 2: Steps, SemiLock, and Step Edit.

Those are described briefly in the previous chart, and we'll cover SemiLock more thoroughly in a later section. Let's work with SemiLock Off for now.

1. Press [INIT] twice to initialize the patch.
2. Hold [LFO 1] and press [OSC 1] to create a mod route.
3. Use Control knob 6 to set Depth to 128.0
4. Access [LFO 1]
5. Select the Step wave with Control knob 1.
6. Select page 2 with the Page down arrow
7. Leave the Steps value at 8 for now.
8. Use Control button 8 to access the Step Edit page.
9. Notice that steps 1, 2, and 3 are set to 60.0, -60.0, and 0.0, respectively. Note: Multiples of 5 provide specific pitches, but intermediate values can be used.
10. Hold a note. Three octaves of the same pitch will play. The third pitch is longer because the last six steps are set to the same value.
11. Keep holding the note and notice that the 8-step sequence repeats.
12. Enter values on the other steps to see how that affects the Step LFO output.

Let's dive deeper into the Step LFO.

SemiLock

SemiLock displays the steps inside the Step Edit page in semitone values. This makes it easy for an LFO to play standard 12-tone pitches. Let's try with SemiLock On this time.

1. Press [INIT] twice to initialize the patch
2. Hold [LFO 1] and press [OSC 1] to create a mod route
3. Use Control knob 6 to set Depth to 128.0
4. Access [LFO 1]

5. Select the Step wave with Control knob 1
6. Select page 2 with the Page down arrow
7. Leave the Steps value at 8 for now.
8. Use Control knob 7 to set SemiLock to On
9. Use Control button 8 to access the Step Edit page
10. Notice that steps 1, 2, and 3 are set to +12semi, -12semi, and 0semi, respectively. These are the chromatic equivalents of the non-SemiLock values.
11. Hold a note. Three octaves of the same pitch will play.
12. Enter values on the other steps to see how that affects the Step LFO output.

But what if a step value isn't a multiple of 5? Continuing with the previous example:

1. Press [EXIT] and use Control knob 7 to set SemiLock to Off
2. Access the Step Edit page via Control button 8 and set any step to a value that is not a multiple of 5 (e.g., 9.9)
3. Press [EXIT] and use Control knob 7 to set SemiLock back to On
4. Access the Step Edit page again (Control button 8). The non-multiple step has an asterisk (e.g., +1semi*)
5. As the related Control knob is turned the value changes to exact semitone values and the asterisk disappears.

Let's try a Step LFO with more than 8 steps.

1. Press [EXIT] and use Control knob 1 to select a different number of Steps
2. Enter the Step Edit page via Control button 8
3. Use the Page up/down buttons to access steps 9-16, 17-24, etc.
4. Select semitone values for each step as needed.

To dive deeper, press [EXIT] and try other settings for Smooth, Rate, BPM = On, etc. With 64 steps and a synced LFO rate of 1/16, for example, an LFO can play a 4-bar melody!

Remember, in order for the Step LFO semitone values to quantize to the chromatic scale, be sure to do the following:

- Set the LFO output level to 128.
- In the Mod Matrix, route the LFO to the pitch of an oscillator with a depth of 128.

With those conditions met, the Step LFO semitone values will always match the 12 pitches in the chromatic scale.

Keyboard note entry

You can select semitone values inside the Step Edit page with the keyboard. Simply hold the Control button for any step, then press a key in the 2-octave range around middle C to set the value.

You might hear the wrong pitch at first if you hold Control button 1 and play a note to set the semitone value for step 1. The reason: LFO1 starts as step 1 is entered, and it restarts with every new note (unless TrigSync = Off). The result: double-transposition of the first note. The right pitch will play when the LFO loops.

One-Shot LFOs: Step Advance

The LFO One-Shot mode has a third option: Step. When both the LFO Wave and One-Shot mode are set to Step, each time that LFO is triggered it advances to the next Step in the sequence.

Other parameters affect how this works. But for now, let's set up a crazy little Step LFO! Starting in Single mode:

1. Press [INIT] twice, then press [LFO 1].
2. Select Wave = Step with Control knob 1.
3. Press [LFO 1] to access LFO page 2.
4. Select One-Shot = Step with Control knob 4.
5. Use Control knob 7 to set SemiLock to ON. This provides semitone values in the Step Edit menu.
6. Press Control button 8 to enter the Step Edit menu.
7. Select values between -12 semi and +12 semi.
8. Hold [LFO 1] and press [OSC 1] to set up a mod route.

9. Set a mod depth of 128 using Control knob 6.
10. Play the same note 8 or more times. Each time the LFO is triggered the sequence advances by one Step!

Here are some important notes about Step LFOs:

- Be sure to review the *SemiLock (p. 63)* section for other ways to make the Step LFO sequence conform to the chromatic scale.
- When One-Shot = Step the Smooth setting has no effect. It is applied only when One-Shot = ON or OFF.
- Step LFOs advance differently depending on the Stereo Mode setting on page 2 of the Voice module. See the next section for details.

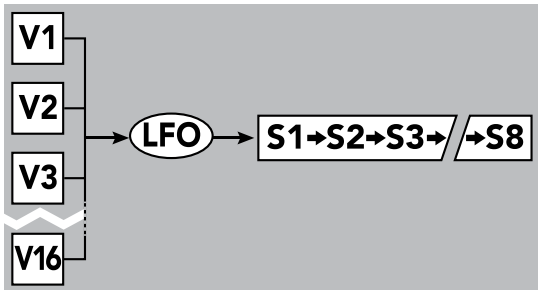
Step Advance options

In this section we'll learn about different ways to make the Step LFOs advance.

LFO: TRIGSYNC SETTINGS

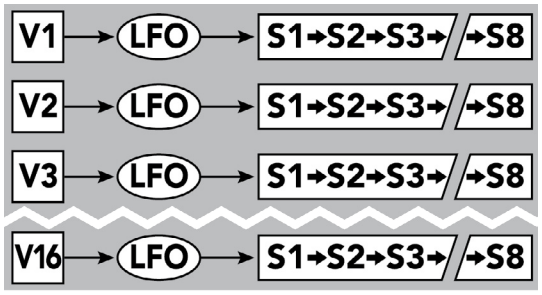
The LFO TrigSync settings are found and described in *LFO parameters: page 1 (p. 61)*. In this section we'll focus on two of those settings (Single and Poly) and how they are used to advance a Step LFO sequence. Remember: there are 5 LFOs, and it's possible to have each one configured differently.

TrigSync: Single means that all voices share the selected LFO. Triggering any voice advances that Step LFO sequence for all voices.



TrigSync: Single (V = Voice / S = Step)

TrigSync: Poly means that each voice has its own copy of the selected LFO. Triggering a voice advances the Step LFO sequence only for that voice, and only for that copy of the LFO.



TrigSync: Poly (V = Voice / S = Step)

When TrigSync = Poly the StMode settings have a big impact on Step Advance behavior. Be sure to read the information in the next section to get the full picture.

VOICE: STMODE SETTINGS

The LFO TrigSync settings also interact with the Stereo mode settings in the Voice module. The full descriptions are here: *Stereo mode (p. 74)*. In this section we'll focus on two of those settings (Alter and Rotate) and how they are used to advance a Step LFO sequence. Remember: there are 5 LFOs, and it's possible to have each one configured differently.

Note: When TrigSync = Single the shared Step LFO advances the same way regardless of the StMode setting. So for these descriptions we will assume that TrigSync = Poly. Remember: this is the setting where each voice has a dedicated copy of the selected LFO.

StMode: Alter allocates the voices based on how many voices are already active. If you start by playing only one note, you're playing Voice 1. If you hold that note and play another one you're playing voice 2, and so on. So when you're working with a Step LFO and want the sequence to advance for Voice 1, play only one note and play it repeatedly. If you want the sequence to advance for Voice 2, hold Voice 1 and play a second note, and so on.

To summarize:

- If the first note is played staccato by itself, Voice 1 is triggered each time and its dedicated LFO outlines the sequence with each successive trigger.
- If the first note is held and another note is played, Voice 2 is triggered and its dedicated LFO begins its sequence with the same results, and so on through all available voices and their LFOs.

StMode: Rotate. The One-Shot: Step setting is voice-independent, which means that with TrigSync = Poly each of the voices will follow its own LFO step pattern. And when StMode = Rotate, every note you trigger will take the first available voice, and make that LFO advance by one step for that specific voice.

For example, when you first select the patch:

1. The first triggered note uses Voice 1 and LFO step 1
2. The second triggered note uses Voice 2 and LFO step 1 (not step 2)
3. The third triggered note uses Voice 3 and LFO step 1, etc.

After you cycle through all of the voices and return to Voice 1, it plays LFO step 2, then Voice 2 plays step 2, Voice 3 plays step 2, etc.

To put it another way:

- If one note is played staccato by itself, it must be played 16 times (8 times in Multi mode) before the LFO advances to the next step. This is because the Hydrasynth is cycling through all available voices, and each one has a dedicated LFO that will follow the sequence order independently from the other voices.
- If a note is held and another is played, that note must be played 15 times (7 in Multi mode) before its LFO advances, because the engine is cycling through the remaining voices, and so on.

More Step LFO ideas

Here are more ways to use the Step LFO:

- The maximum Step values are +/- 64.0, so the total range is a little wider than an octave above and below the root pitch.
- Try using one or more oscillators with a Step LFO and BPM set to ON. Different Rate values provide interesting rhythms.
- Oscillators 1 and 2 could play step sequences while Osc 3 drones on the root pitch, for example.
- Try other values of the Steps parameter to make time signatures like 5/4, 6/8, 7/8, etc.
- To hold a pitch for one or more steps, use the same value as the previous step or the next one.
- For longer step sequences, set the LFO 2 Delay so it comes in after LFO 1 (and set LFO 1 to One-Shot = On).
- The Copy feature described below is very useful here: Copy one LFO to another and make slight changes to create counter-point or to harmonize. Be sure to copy *The Mod Matrix (p. 90)* settings also.
- You can invert a melody with mod route level of -128.
- Remember, if you run out of LFOs, you can use a looping envelope as an LFO.

LFO Shortcuts

These are described elsewhere, but they're so easy and useful we've included them here too.

Copy LFO A to LFO B

1. Hold [SAVE]
2. Press and release the source (LFO A)
3. Press and release the destination (LFO B)
4. Release [SAVE].

Create a direct Mod route

To set up a mod route to a specific parameter from inside a module:

1. Hold [LFO X] to select the source
2. Press the Control button for the target parameter, then release both buttons
3. Those appear in the first open Mod slot as the source and destination, respectively
4. Set the modulation amount with the lower Control knob.

The Hydrasynth Deluxe voice engine is so powerful that it only made sense to pair it with an equally powerful effects section. There are four independent effect modules available, two of which provide awe-inspiring delay and reverb effects, while the other two are the aural equivalent of a set of Swiss Army knives. Any tool you need for your music, Hydrasynth Deluxe has it.

Some parameter names are shown below in [brackets]. These are available as mod destinations for Macros and the Mod Matrix. The values for these parameters have finer increments than the others, which ensures maximum resolution when they are being modulated.

Pre- and Post-FX

The only difference between these two FX modules is that one precedes the Delay and Reverb and the other follows them. They serve different purposes due to their placement in the signal path, so they will often have different settings. But since their FX types and parameters are identical, both modules will be covered in this section.

These are the FX types available for the Pre-FX and Post-FX modules:

- Chorus
- Flanger
- Rotary
- Phaser
- Lo-Fi
- Tremolo
- EQ
- Compressor
- Distort

Each FX type has preset templates that can be used as starting points for your own creations. When the patch is saved the FX settings are preserved.

Bypass

This is the default option. To disable the effect module for the current patch, set FXtype to Bypass.

Chorus

Control knob	Parameter	Range	Description
2	Preset	1-3	Selects preset template
3	[Rate]	0.02-10.0 Hz	Controls the chorus rate
4	[Depth]	0.0-128.0	Controls the chorus depth
5	Offset	+/- 180°	Sets initial phase of effect relative to input
6	Feedback	+/- 63	Feeds chorus back into itself (positive or negative polarity)
7	Mono/St	Mono, Stereo	Selects mono or stereo output
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Flanger

Control knob	Parameter	Range	Description
2	Preset	1-3	Selects preset template
3	[Rate]	0.02-10.0 Hz	Controls the flanger rate
4	[Depth]	0.0-128.0	Controls the flanger depth
5	Offset	+/- 180°	Sets initial phase of effect relative to input
6	Feedback	+/- 63	Feeds flanger back into itself (positive or negative polarity)
7	Mono/St	Mono, Stereo	Selects mono or stereo output
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Rotary

Control knob	Parameter	Range	Description
2	Preset	1-3	Selects preset template
3	[Lo-Speed]	0.02-10.0 Hz	Sets speed of low rotor
4	[Hi-Speed]	0.02-10.0 Hz	Sets speed of high rotor
5	Lo-Depth	0-127	Controls depth of low rotor
6	Hi-Depth	0-127	Controls depth of high rotor
7	Low/High	-/+ 63	Volume balance between the low and high rotors
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Phaser

Control knob	Parameter	Range	Description
2	Preset	1-3	Selects preset template
3	[Rate]	0.02-10.0 Hz	Controls the rate of the phase modulation
4	[Feedback]	+/- 63.0	Feeds phaser back into itself (positive or negative polarity)
5	Depth	0-127	Controls the depth of the phase modulation
6	Phase	0-127	Adjusts lowest frequency point of phase modulation
7	Offset	+/- 180°	Controls amount of phase offset relative to input
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Lo-Fi

Control knob	Parameter	Range	Description
2	Preset	1-2	Selects preset
3	[Cutoff]	160-20,000 Hz	Filter cutoff frequency
4	[Resonance]	1.0-12.0	Filter resonance
5	Filter Type	Thru, PWBass, Radio, Tele, Clean, Low	Selects filter model
6	Output	- 6 / + 36 dB	Gain compensation control
7	Sampling	44,100-2,756 Hz	Sets downsampling rate
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Tremolo

Control knob	Parameter	Range	Description
2	Preset	1-3	Selects preset template
3	[Rate]	0.02-10.0 Hz	Controls the tremolo rate
4	[Depth]	0.0-128.0	Controls the tremolo depth
5	LFO shape	Sine, Square	Selects tremolo waveshape
6	Phase	+/- 180°	Phase relationship of left / right LFOs
7	Pitch Mod	0-127	Controls vibrato depth
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

EQ

Control knob	Parameter	Range	Description
2	Preset	Flat, LowBoost, Bass Cut, High Cut, Smile, Lo-Fi, Warm	Selects preset template
3	[LowGain]	- 36.0 / + 24.0 dB	Controls low frequency cut/boost amount
4	[HighGain]	- 36.0 / + 24.0 dB	Controls high frequency cut/boost amount
5	MidGain	- 36 / + 24 dB	Controls mid frequency cut/boost amount
6	Xover Lo	32-2,000 Hz	Sets crossover point from low to mid range
7	Xover Hi	512-16,000 Hz	Sets crossover point from mid to high range
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Compressor

Control knob	Parameter	Range	Description
2	Sidechain	Off, BPM Duck, Tap, Mod In 1, Mod In 2	Selects sidechain source: Arpeggiator clock, Tap Tempo button, CV Mod Input 1 or CV Mod Input 2
3	[Ratio]	1.0 :1 to 20.0 :1	Controls compressor strength above threshold
4	[Threshold]	-64.0 to 0.0 dB	Controls level at which compression begins
5	Attack	1-400 ms	Time until maximum compression
6	Release	5-560 ms	Time to zero compression if signal is below threshold
7	Output	0-512	Gain compensation
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Distort

Control knob	Parameter	Range	Description
2	Preset	Drive 1-3	Selects a preset template
3	[Drive]	0.0-128.0	Sets the signal level sent to the distortion circuit
4	[Tone]	+/- 64.0	Controls output bandwidth: -64.0 to -0.1: high cut 0.0: bypass 0.1 to 64.0: low cut
5	Asym	0-128	Changes how the clipping effect is applied: 0 = a balanced (symmetrical) output Higher levels = increasingly asymmetrical output
6	Curve	0-128	Changes the saturation curve in the distortion: 0 = an overdrive type of effect Higher levels = increasingly harsh distortion
7	Output	-36 / +24 dB	Gain compensation control
8	[Dry/Wet]	0.0-100.0%	Blends unaffected and affected signals

Delay Types

Hydrasynth Deluxe offers 5 delay types, each with distinct characteristics:

- **Basic Mono** combines the stereo input signal and produces a mono delay.
- **Basic Stereo** preserves the stereo positioning of the input signal.
- **Pan Delay** alternates between the right and left input signals.
- **LRC Delay** outputs the left input, then the right input, then both, and repeats that pattern.
- **Reverse** takes whatever comes in during the delay period and plays it backward.

Delay Parameters

All of the delays have identical parameters, so we'll describe them once.

Control knob	Parameter	Range	Description
2	[Time]	BPM = Off: 1 ms to 3.00 seconds BPM = On: 0, 1/64T to 1/1 Dot	Delay period
3	[Feedback]	0.0-128.0	Fade-out time for delay
4	[Wet Tone]	-/+ 64.0	Filter control for Wet signal: -64.0 to -0.1: Low pass filter 0.0: No filtering 0.1 to 64.0: High pass filter
6	BPM sync	Off, On	Toggles delay sync
7	[Feed Tone]	0.0-128.0	Feedback high-frequency decay time
8	[Dry/Wet]	0.0-100.0%	Blends uneffected and effected signals

Reverb Types

Hydrasynth Deluxe provides 4 reverb types, each with distinct characteristics:

- Hall
- Room
- Plate
- Cloud

Reverb Parameters

All of the reverbs have identical parameters, so we'll describe them once.

Control knob	Parameter	Range	Description
2	PreDelay	0.5-250 ms	Length of time before reverb
3	[Time]	120 ms - 90 seconds, Freeze	Decay time of reverb Freeze is indefinite without damping
4	[Tone]	-/+ 64.0	Filter control for Wet signal: -64.0 to -0.1: Low pass filter 0.0: No filtering 0.1 to 64.0: High pass filter
6	[Hi Damp]	0.0-128.0	Reverb high-frequency decay time
7	[Lo Damp]	0.0-128.0	Reverb low-frequency decay time
8	[Dry/Wet]	0.0-100.0%	Blends uneffected and effected signals

Freeze the Reverb

While on Reverb module page 1, hold [SHIFT] and press Control button 3 and the reverb time will jump to Freeze. If the Hi / Lo Damp parameters are set to zero, the Freeze setting will hold the reverb indefinitely. Any notes that are played will be added to the effect.

A Macro button can toggle the Freeze value on and off; just set the BTN VALUE to 128.0. To learn more about setting up a Macro, see *Mastering the Macros (p. 86)*.

Mod Route Shortcut

Here's how to set up mod routes quickly from an Envelope or LFO to an effect:

- Hold the module button for the desired source
- Press the module button for the destination. This will create a mod route in the Mod Matrix at the first available slot with the first parameter of the effect selected.
- Change the selected parameter if needed
- Set the mod amount with the appropriate Control knob.

Remember: not all FX parameters are available as mod destinations.

Global FX Bypass

You can also enable and disable the Pre/Post FX, the Delay, and/or the Reverb for all patches (i.e., globally). See Master Page 2: *FX Bypass Menu (p. 103)*

Technically the Voice module isn't in the signal path, so it isn't located in the Module Select section of the top panel. But its functions have a significant impact. Many settings related to the playability and performance of the patch are found here.

Voice Parameters: page 1

Control knob	Parameter	Range	Description
1	Polyphony	Poly, Mono, MonoLo, MonoHi, Unison, UnisonLo, UnisonHi	Sets polyphony mode, note priority
2	Density	1-16	Density of voices in Unison modes
3	Detune	0-127	Detune amount in Unison modes
4	Analog Feel	0-127	Adjusts parameter drift (see below)
5	Random Phase	Off, On	Toggles random phase per voice
6	Stereo Mode	Rotate, Alter, Random	Stereo voice allocation (see below)
7	Stereo Width	0-127	Stereo dispersion for Unison and Poly modes. Has no effect on Mono mode.
8	Warm Mode	Off, On	Simulates a "warm" frequency curve

Polyphony settings

It's possible to stack all 16 voices on one note in Single mode, if you like. But keep in mind that a unison patch with a Density value of 9+ voices will be changed to 8 voices automatically when used in Multi mode. This is the maximum number of voices available for each part.

There are seven settings here, but they fall into three main groups:

Poly, Mono, Unison

The Poly setting allows all 16 of the Hydrasynth Deluxe voices to trigger independently. When the ribbon is set to Theremin mode, one voice is reserved for that purpose and the other 15 are available from the keyboard.

Mono and Unison modes are monophonic; they only allow you to play one note from the keyboard.

Lo, Hi, or both

Both Mono and Unison modes have additional Lo- and Hi- options. Here's the difference:

- **Lo** (low note priority): The only way to trigger a new note is to play one below the held note.
- **Hi** (high note priority): The only way to trigger a new note is to play one above the held note.
- If an option doesn't say "Lo" or "Hi", it's both: A new note can be triggered by any note above or below the held note.

Density & Detune

The Density and Detune parameters are only active when one of the Unison modes is selected. **Density** sets the number of voices that are triggered by the monophonic note. **Detune** offsets the tuning of each of those voices equally within the range set by the Detune value.

Random Phase

Part of what breathes life into the sound of an analog synth is that its oscillators are always running; waveforms could be anywhere in their cycles when they are triggered. It's the nature of their circuits; they must be told to reset. This parameter emulates that behavior by telling the digital oscillators **not** to reset their phase to 0° when they are triggered.

How does Analog Feel?

Another thing that makes an analog synthesizer seem so "alive" is its inherent instability. This unpredictability is an issue not only in the tuning of the oscillators but throughout the signal path. The Analog Feel parameter allows you to dial in as much of this behavior as you like, from "a little bit" to an amount that would summon a repair tech if you hadn't done it on purpose.

Stereo mode

The Stereo mode setting is most noticeable when Stereo Width is > 0 and Polyphony is not set to one of the Mono modes.

These two parameters work together: StMode determines the voice playback order, and StWidth controls the amount of stereo spread between the voices.

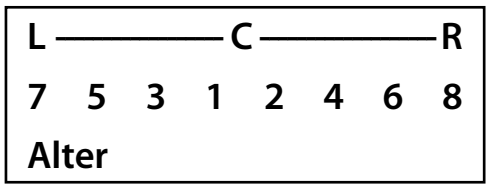
Rotate

This setting arranges the 16 voices in an orderly fashion across the stereo field. The Hydrasynth engine will change voices every time a note is played, even if the same note is repeated. The voices will play in order from left to right (1-2-3-4-5-6-7-8, etc.), with the stereo spread defined by the Stereo Width value.

The Unison modes follow the same pattern. Note that with odd-numbered Density values you may notice the voice order "wrap around" after the 16-voice limit is reached (16-1-2, etc.).

Alter

With this option the voices take turns spreading further and further from center. Stacked voices progress in the same fashion (*3-1-2-4, 7-5-6-8,* etc.). When all notes are released the voice order resets so that the next note on will trigger voice 1 in the center. And again, the stereo spread is defined by the Stereo Width value.



Stereo mode: Alter (Unison mode, Density = 8)

Random

This option randomizes the voice selection when a note is triggered. If Stereo Width is > 0, the voices appear in the stereo field at the same positions they use in Rotate mode.

Rotate vs. Alter

The following table describes the differences between the Rotate and Alter settings for the Stereo mode parameter.

StMode	Method	Result
Alter	Repeat 1 note	V1, V1, V1, V1, etc.
	Repeat 4-note chord	V1-4, V1-4, etc.
	Hold note 1 Repeat note 2	V1 V2, V2, V2, etc.
Rotate	Repeat 1 note	V1, V2, V3, V4, etc.
	Repeat 4-note chord	V1-4, V5-8, etc.
	Hold note 1 Repeat note 2	V1 V2, V3, V4, etc.

The StMode setting has a big influence on how the LFOs behave, especially the Step LFOs. For more information, see *Step Advance options (p. 65)*, especially the section titled **Voice: StMode settings**.

Warm mode

Warm Mode simulates the frequency curve of a popular "warm" synthesizer by reducing the high end a bit and boosting the low end.

Voice Parameters: page 2

Control knob	Parameter	Range	Description
1	Pitch Bend	0-24	Positive/negative pitch bend range in semitones
2	Vibrato Amount	0.0-12.0	Maximum depth of mod wheel vibrato in semitones

3	Vibrato BPM	Off, On	Toggles Vibrato from Hz to tempo divisions
4	Vibrato Rate	BPM = Off: 0.30-10.00 Hz BPM = On: 1/4 to 1/32Dot	Sets rate of Vibrato effect
5	Glide	Off, Glide, Glissando	Toggles effect, selects type
6	Glide Time	0-127	Controls Glide rate (hidden if Glide = Off)
7	Glide Curve	Exp (-64) > Lin (0) > Log (64)	Sets Glide curve (hidden if Glide = Off)
8	Glide Legato	Off, On	If On, only legato playing activates Glide (hidden if Glide = Off)

Pitch Bend

This parameter enables the pitch bend wheel to cover as much as a four-octave range: two octaves up and two octaves down (+/- 24 semitones). You can set the range to a whole step, or a musical fifth, or whatever you prefer. The setting is saved when you save the patch.

Vibrato settings

The Vibrato feature provides a sixth LFO that modulates the pitch of all 3 oscillators at once. It is controlled by the mod wheel. This avoids having to use a mod route to make the same connection. The mod wheel can still be used for other purposes through the Mod Matrix, and also as a volume control for the Ribbon when it is in *Theremin Mode (p. 80)*.

The Vibrato rate locks to tempo when its BPM parameter is set to On. This enhances the musicality of the vibrato; singers and musicians do this naturally to match the music.

Glide settings

Glide vs. Glissando

Glide causes the pitch to slide between notes rather than changing in chromatic steps. Glissando provides a "stepped" glide, rather than providing a smooth glide between the start and end notes.

For extra fun, press [VOICE] again to access page 3 and use Control knob 2 to select a non-chromatic scale. The glissando follows the selected scale, which can provide excellent musical results. You may want to use the Key Lock setting, too; this is described on the next page.

Other Glide settings

When the Glide effect is enabled it reveals another three parameters on Voice page 2. The same thing happens when the Glide button is toggled on the top panel.

The Glide curves are similar in shape to the envelope segment curves:

- An **exponential** curve rises slowly at first and accelerates upward. When moving downward it starts falling quickly and slows down as it approaches its destination.
- A **logarithmic** curve does the opposite: It rises quickly at first and its rate of change slows as it nears the peak. In the opposite direction it starts falling slowly and accelerates until it reaches its resting state.
- A **linear** curve rises and falls at the same rate throughout its duration.

Enabling the Glide Legato setting changes the way Glide works: staccato notes will not glide; notes played in a legato fashion will glide.

Glide Legato can be less predictable when Polyphony mode = Poly. The reason: Each individual voice has its own legato, and legato playing only happens when the same voice is retriggered. For example, if voice 1 is the next one that will be triggered, playing a legato note will glide voice 1 from its current note to the new note.

Voice Parameters: page 3

Control knob	Parameter	Range	Description
1	Key Lock	(Chromatic octave)	Lock keyboard to a certain key. No effect if Scale = Chromatic or Micro#(x).
2	Scale	Custom + 38 presets + 32 Micro scales	See Custom Scale below; see *Scales (p. 116)* for preset scales; see *Master: Page 2 (p. 102)* for Microtuning operations.
3	Microtuning Scale	Scale name	Visible when a microtuning scale is selected. see *Master: Page 2 (p. 102)* for Microtuning functions.
4	Scale Edit	(access)	Enter Scale Edit page (visible when Scale = Custom)
5	SusPedal	Sustain, Sosten, Mod Only	Select sustain pedal function for the patch
7	VoiceMod Edit	(access)	Enter VoiceMod Edit page
8	Snap	Off, On	Quicker attack, for sharp initial transients

Key Lock

The Key Lock parameter works with the preset scales to specify which notes the keyboard is allowed to play. It only applies to preset scales (not Custom, Chromatic, or Microtuning).

Select a Scale

There are 38 preset scales and 32 microtuning scales available. If you don't find the one you want, you can create a custom 12-tone scale inside the Hydrasynth Deluxe or import new microtuning scales.

When a non-chromatic scale is selected, notes that are not in the scale are filtered out. So if you play notes outside of the selected scale, they will be quantized to the pre-determined scale notes. This also affects the incoming MIDI notes.

However, outgoing MIDI notes are not affected; if C#3 is not in the scale and you play the C#3 key, a C#3 will be transmitted over MIDI and USB.

For a list of the scales and the notes they contain, see *Scales (p. 116)*. For information about working with microtuning scales, see *Master: Page 2 (p. 102)*.

Custom Scale

The Custom scale option is located at the bottom of the scale list. To get there from Voice page 3, turn Control knob 2 fully counter-clockwise.

Scale Edit

After the Custom scale is selected, press Control button 4 to enter the Scale Edit page. Here's what you'll see:

- Control button 1: This is the first note in the custom scale, and it is based upon the Key Lock setting. The Control knob is disabled.
- Control knobs 2-8: These represent notes 2-8 of the custom scale.

Quick assign

To assign notes quickly to the custom scale, hold Control button 1 and play the desired notes on the keyboard. The existing notes will be cleared as soon as you play the first note.

Note that if the root note is entered it will be ignored (it's the Key). It's okay to enter the notes out of order; they'll be placed in chromatic order when Control button 1 is released.

Clear a note

To clear one or more notes, hold [INIT] and press the corresponding Control button(s). You can't clear the Key selection on Control button 1; that's the root key of the scale. To change it, exit this page and adjust the Key Lock parameter.

Individual note assign

If you entered a wrong note, hold the related Control button and play the correct note. The Control knob also can be used to select the note. Again, it's okay if the new note is not in chromatic order; this will be corrected after pressing [EXIT].

Microtonality

Microtonal scales open up a new world of musical expression beyond the 12 tones most prevalent in the music of the West. Now you can compose and perform music from any culture or harmonic discipline.

There are 32 memories for loading custom scales. Hydrasynth Deluxe includes 32 scales provided by various artists from around the world, but any of these can be replaced. You can create your own scales using a freeware application such as Scala, for example, as well as download new scales from the *www.AshunSoundMachines.com* web page.

Selecting a Microtuning Scale

To select a microtuning scale, navigate to the Scale options on page 3 of the [VOICE] menu and use Control knob 2 to scroll through the list of scales. The 32 microtuning scales show up at the end of the list. The name of the selected microtuning scale is shown in display field 3.

For more information about working with microtuning scales, see *Master: Page 2 (p. 102).*

Sustain Pedal options

The sustain pedal has three options per patch: Sustain, Sostenuto, and Mod Only.

Sostenuto

Most grand pianos have a middle "sostenuto" pedal which can sustain a note or chord without sustaining the other notes. As long as that pedal is held down, whenever the selected notes are played they will sustain while all of the other notes play normally.

The Hydrasynth can do this too! This makes it possible to sustain one or more bass notes while changing the upper chords, for example, or play a bass line under a sustained chord, etc.

Let's try it! Starting in Single mode, access page 3 of the [VOICE] module and use Control knob 5 to select "Sosten" for the SusPedal parameter. Then:

1. Hold the note or chord you want to sustain.
2. Press the pedal and release the notes. The selected notes continue to sustain.
3. Still holding the pedal, play other notes: only the pre-selected notes sustain, and the others don't.

As long as the pedal is held the pre-selected notes are sustained and their voices cannot be

stolen by another note. For example, if you use sostenuto in Single mode to hold 16 notes and then try to play another note, the new note does not play. The sostenuto voices are not released until you lift the pedal, after which those voices are available again.

Note that the sustain pedal always sends MIDI CC #64. It does not send MIDI CC #66 when SusPedal = Sostenuto.

Mod Only

It is also possible to use the sustain pedal as a mod source without sustaining a patch. Here's an example:

1. Starting in Single mode, press [INIT] twice to start from ground zero.
2. Turn Cutoff all the way down.
3. Press [MOD MATRIX] and then Control button 2 to select the first mod route source.
4. Hold [SHIFT] and turn Control knob 2 until ExpPedal is selected.
5. Release [SHIFT] and turn Control knob 2 clockwise to select SusPedal as the source.
6. Press Control button 6 and then [FILTER 1] to select it as the Destination.
7. Turn Control knob 6 to a positive value of 30 or higher.
8. Play a note, press the pedal, and release the note. The filter opens and the note sustains.
9. Release the pedal, press [EXIT], and then press [VOICE] three times to access page 3.
10. Use Control knob 5 to select "Mod Only" for the SusPedal parameter.
11. Repeat step 8. The filter opens but the note does not sustain.

The possibilities are endless: the pedal can control an LFO, a Mutant, an effect time or level, etc., without sustaining a note.

It's always possible to use the Sostenuto or Mod Only settings with the pedal, and then sustain all of the notes by holding [SHIFT] and pressing [LATCH].

VoiceMod Edit

The VoiceMod Edit menu lets you dial in a certain amount of deviation per voice, per patch. This enables the Hydrasynth Deluxe to exhibit varying levels of instability like your favorite analog synths of the past. The good news is that it only shows up when you want it!

The fun starts in the VoiceMod menu, where you can define a per-voice offset to be applied via the Mod Matrix to any destination. Use it to set each voice's filter cutoff to slightly different values, for example, or to apply radically different Mutant values to each voice. Note: To hear this, be sure to map a VoiceMod source to at least one mod destination in the Mod Matrix.

In this section we'll describe how to access and change the per-voice offset values; in the next we'll explain how to route them to a destination. Starting in Single mode:

- Press [VOICE] three times to access page 3.
- Press Control button 7 to enter the VoiceMod menu.
- Use Control knobs 1-8 to set a positive or negative value for Voices 1-8.
- Press the Page Down arrow to reach the second page of VoiceMod settings. Note that there is only one page in Multi mode.
- Use Control knobs 1-8 to set a positive or negative value for Voices 9-16.

The [INIT] and [RANDOM] buttons can be used to reset or randomize each value; hold one of

those and press the Control button for the desired voice.

Per-voice offset examples

To use the VoiceMod feature you need to set up a mod route using one of these sources in the Mod Matrix: VoiceMod (bipolar) or VoiceMd+ (unipolar). They are found in the Source list between MPE-Yrel and CC 000.

Let's try two examples, which you can use as a framework for further explorations. Results can range from subtle to schizophrenic, if you like!

Per-voice offset: Tuning

- Press [INIT] twice, then press [VOICE].
- On page 1 set StMode to Rotate.
- On Voice page 3, use Control button 7 to enter the VoiceMod Edit menu.
- Select values that are multiples of 10.
- Hold [VOICE] and press [OSC 1] to set up a mod route.
- Set a mod depth of 128 using Control knob 6.
- Play the same note 8 times. It plays a melody!

Per-voice offset: Waveforms

The VoiceMod feature can even be used to make each voice play a different waveform!

1. Press [INIT] twice, then press [VOICE].
2. On page 1 set StMode to Rotate.
3. On Voice page 3, use Control button 7 to enter the VoiceMod Edit menu.
4. Set each voice to a different value between +64 and -64. Do this on page 2 for voices 9-16 also.
5. Press [OSC 1] and change the Mode to WaveScan.
6. Hold [RANDOM] and press Control button 2 to randomize the Wavelist.
7. Hold a note and turn Control knob 5 to be sure the waveforms are obviously different. If not, repeat step 6.
8. Set WaveScan to 4.5.
9. Hold [VOICE] and press [OSC 1] to set up a mod route.
10. Change the destination to WaveScan with Control knob 2.
11. Use Control knob 6 to set a mod depth of 128.
12. Play some notes. Each one plays a different waveform!

There are two ways to achieve zero modulation for a voice when setting up a mod route. When the mod source = VoiceMod, set the VoiceMod Edit value to 0 for that voice. If the source = VoiceMod+, use a VoiceMod Edit value of -128 instead.

Snap

Snap shortens the initial attack time to provide sharper initial transients. When Snap is Off the original timing on the fade in of the waveform is retained; when it's On the start time is shortened to be nearly instant. This gives bass and percussive patches more presence.

The Ribbon controller has three modes of operation. Press the [Ribbon] button and use Control knob 1 to select the desired mode:

- **Pitch bend** is like the pitch bend wheel, only horizontal. Wherever the ribbon is touched becomes the center point. **Lock Global** makes this true for all patches.
- **Theremin** allows the ribbon to be played like a monophonic synthesizer. It also reveals more parameters and adds another page where its key and scale can be set. These are described below in the Theremin mode section.
- **Mod Only** routes the ribbon entirely through *The Mod Matrix (p. 90)*, where it can be used in several ways as a modulation source. Two more parameters appear in this mode:
  - **Hold** will maintain the modulation level of the ribbon if you lift your finger
  - **Lock Global** makes the ribbon settings of this patch apply to all patches. Otherwise the ribbon status can be different for each patch.

The Ribbon button can be used to set up a route in the Mod Matrix: Access the module page that has the parameter you want to control, hold [RIBBON], and then press the Control button for the destination parameter. After the mod route appears in the Mod Matrix, simply set an amount with the lower Control knob.

Theremin Mode

When the ribbon controller is in Theremin mode it reserves a voice for itself. This reduces the number of voices available on the Hydrasynth Deluxe keyboard from 16 to 15. The polyphony of the ribbon itself is limited to 8 voices when the patch is in Unison mode.

Theremin mode offers the **Hold** and **Lock Global** settings described above, and several more. There are two parameter pages in this mode; the others have only one page.

Theremin parameters: page 1

- **Key span** sets the ribbon range. 4 oct matches the ribbon to the keys below it; 2 oct compresses the range; 6 oct expands it.
- **Octave shift** moves the ribbon center to reach notes beyond the keyboard range.
- **Quantize** allows the ribbon to play only notes within the selected key and scale (see Theremin parameters: page 2).
- **Glide** lets notes triggered by the ribbon travel from one note to the next. Set the rate with the Control knob. When Quantize is enabled Glide conforms to the selected key and scale (see Theremin parameters: page 2). These settings are independent from the Glide settings on [VOICE] page 2.
- **Wheel volume** enables the mod wheel to act as an inverted volume control for the ribbon in Theremin mode. As the wheel moves upward the volume of the ribbon note is reduced.

Theremin parameters: page 2

- **Key Lock** sets the root note for the ribbon scale.
- **Scale** determines which notes the ribbon is allowed to generate. This setting is independent from the keyboard Scale on [VOICE] page 3. The *Custom Scale (p. 76)* feature works the same way for both the ribbon and the keyboard.

The Ribbon can be in Pitch Bend mode or Theremin mode and be a mod source in the Mod Matrix at the same time.

The Ribbon as a Mod Source

There's a separate chapter that describes how to use *The Mod Matrix (p. 90)*, so you'll want to read that too. But the way the ribbon interacts with the Mod Matrix deserves special coverage here. It actually provides three different mod sources, not just the one you see!

The fastest way to learn about the different sources is to build a mod route, so here we go:

1. Press [INIT] twice to initialize the patch
2. Press [RIBBON] and select Mod Only with Control knob 1
3. Press [MOD MATRIX]
4. Press Control button 2 to activate the Assign function
5. Press [RIBBON]. "RbnAbs" appears in the Source field.
6. Turn Control knob 2 slowly clockwise
7. Note the values of "RbnAbs+" and "RbnRel".
8. Press Control button 6 to select the Destination field
9. Press [OSC 1] and set a value of any amount with Control knob 6
10. Press Control button 2 and use Control knob 2 to select the various ribbon sources
11. Hold a note on the keyboard and experiment with the different ribbon sources.

- **RbnAbs** (*Ribbon Absolute*): the middle of the ribbon = 0. Move to the left for negative mod values; move to the right for positive values.
- **RbnAbs+** (*Ribbon Absolute Positive*): the left end of the ribbon = 0, the right end = maximum modulation. Touch a spot in the middle and it generates a value based on the distance between the left and right endpoints.
- **RibbnRel** (*Ribbon Relative*): Wherever the ribbon is touched = 0. Move to the left for negative mod values; move to the right for positive values.

The Ribbon as a Trigger Source

An envelope can be triggered by many sources, including the ribbon controller. For information about setting up multiple triggers for the envelopes, see *Envelope parameters: page 3 (p. 60).*

A well-designed arpeggiator can make someone who's new to music sound like a pro. Add a bit of music theory and some sound design chops to the mix and the results can be amazing. The presets make an ironclad case for that.

An overview of the Hydrasynth Deluxe arpeggiator features was provided in the *Arpeggiator basics (p. 12)* section of the Quick Start Guide. Information about using the arpeggiator in Multi mode is found in *Multi mode & the Arpeggiator (p. 33)*. The main focus of this chapter is to describe the arpeggiator parameters and how to use them.

Arp Edit Mode

To enter Arp Edit mode, hold the [SHIFT] button and press [ON] in the Arpeggiator section of the top panel. The Right display will reveal the first eight parameters of Arp Edit mode. Use the Page Down arrow to access the second page of parameters.

Arp parameters: page 1

Tempo

Use Control knob 1 to adjust the tempo, or press [TAP TEMPO] three or more times to set the tempo manually. Hold [SHIFT] while turning Control knob 1 to fine-tune the tempo.

If Clock Sync is set to an external source the letters EXT will be shown instead of the tempo. This setting is found on *MIDI: Page 4 (p. 105)*.

Division

Control knob 2 selects the basic time division of the arpeggiator relative to the tempo. There are 12 settings here, 4 more than the top panel controls can reach. The Triplet options are at the end of the list, and the Triplet LED will light as they are selected. You can also press [TRIPLET] to select that setting immediately.

Swing

The top panel Swing knob offers eight settings, including Off. But there are actually 26 settings between 50% and 75%. Use Control knob 3 to select a value, or use the Swing knob first and then Control knob 3 to select a nearby value.

Gate

Turn Control knob 4 to adjust the relative duration of the arpeggiator notes. The full range of the parameter is available here and on the top panel: 5% to 100%.

Octave mode

This parameter is not present on the top panel. It works together with the Octave setting, which must be >1 or you may not hear a difference. Use Control knob 5 to select the options. The descriptions are based on an Octave setting of 2 except as noted:

- **Up** plays the notes in the original octave and then repeats the pattern an octave higher.
- **Dn (down)** plays the notes in the original octave and then repeats the pattern an octave lower.
- **UpDn** (Octave = 3) plays the notes in the original octave, repeats them in the next 2 octaves, repeats them in the middle octave, and starts over.
- **Alt** plays the notes in the original octave, repeats them in the next octave, and then reverses the entire pattern. The top and bottom notes are repeated.
- **Alt 2** is identical to Alt except the top and bottom notes are *not* repeated.

Octave

Use Control knob 6 to set the range of the arpeggiator. Minimum range is 1 octave; maximum range is 6 octaves.

Mode

Control knob 7 is used to specify the direction of the arpeggio and other behaviors. For the following descriptions we'll use a 3-note chord with Octave Mode = Up and Range = 2.

- **Up** plays the notes from low to high in each octave and repeats from the bottom.
- **Down** plays the notes from high to low in each octave and starts again from the top note of the low octave.
- **Up / Dn** plays the notes forward/backward in each octave and starts again from the bottom. The top and bottom notes are repeated in each octave.
- **Up & Dn** is identical to Up / Dn except the top and bottom notes are *not* repeated in each octave.
- **Order** plays the notes in the same order you did, repeats them in the next octave, and starts again from the bottom.
- **Random** plays the notes in a random order in each octave.
- **Chord** plays all held notes at one time in the first octave and then plays them again in the second octave.
- **Phrase** provides preset musical phrases that repeat in each octave. There are 64 of them (see *The Phrases (p. 118)*), and the selection is made on Arp Edit page 2.

Tip: To make an arpeggio play the notes in order all the way up and down, use Octave Mode = Alt 2 and Mode = Up.

Length

This parameter specifies the number of notes that will be part of the arpeggio before the pattern repeats itself. When Mode = Phrase the Length setting determines how many steps of the Phrase will be allowed to play.

We'll give a couple of examples, but you'll want to try different settings to understand the way this parameter interacts with the other settings. For these examples use Mode = Up, Oct Mode = Up, and Range = 2.

- With Length = 3, hold a 4-note chord. The arpeggiator will only play the first 3 notes in the chord. To hear all four, set Length to 4. They will only play in the first octave.
- Increase Length to 5. The lowest note of the chord will appear in the second octave.
- Increase Length to 6, then 7, then 8. Gradually each note of the chord will appear in the second octave.
- Increase Length to 9. The lowest note of the chord will be repeated in the first octave and the pattern will repeat.
- Increase Range to 3. The lowest note of the chord will appear in the third octave instead of the first octave.

When Length = Default the arpeggios play their full length based on the various settings and the number of held notes.

Arp parameters: page 2

Tap Trig

When Tap Trig is enabled the arpeggiator triggers a note every time [TAP TEMPO] is pressed. This lets you walk through the pattern one note or chord at a time, depending on the Mode and other settings.

Note that Tap Trig sends signals only to the Gate output. The Clock out still runs at the selected clock rate.

Phrase

Select the Phrase here. To audition them the Mode must be set to Phrase on Arp Edit page 1. For transcriptions, see *The Phrases (p. 118)*.

Ratchet

This specifies how many subdivisions of an arpeggiator step are possible (1, 2, 4, or 8). A Ratchet event is sent to the Gate output, but does not affect the clock output.

Note that Ratchet and Tap Trig work together: Ratchet events are still generated but are triggered manually.

Chance

This determines the likelihood of a Ratchet event happening on a given arpeggiator step. Its values range from 0% (no chance) to 100% (highly likely on every step).

ClkLock

This locks the arpeggiator phase to the system clock so it will sync to other clocked elements such as an LFO with BPM Sync set to On.

Here's something else you might notice:

- With ClkLock set to Off and the Hydrasynth as the master clock source, the arpeggio starts when the first note is played.
- With ClkLock set to On, the arpeggio starts at the next quantized value *after* the first note is played. In this case you might experience a slight delay between triggering a note and the onset of the arpeggio.

Tip: When synced to an external clock:

- Clock Lock On should be used when playing manually
- Clock Lock Off is best when notes are triggered from an external source (e.g., during playback from a DAW)

Arp Step Offset

This parameter can offset an Arp pattern by up to 32 steps, forward or backward. It can be used with standard arpeggios or phrases.

Let's see how the Offset parameter affects a simple 3-note chord:

1. Press [INIT] twice to initialize the patch.
2. Make sure the Arp is not running.
3. Hold [SHIFT] and press [ON] to enter Arp Edit mode.
4. Set Division to 1/4 and Octave to 2.
5. Hold 3 notes and press [ON] to start the Arp. It plays notes 1, 2, 3, and repeats.
6. Press [ON] to stop the Arp, and press the Page Down arrow to access page 2.
7. Set StpOffset to 1 and hold the same 3 notes.
8. Start the Arp. It plays notes 2 and 3, and then repeats notes 1-3.
9. Repeat steps 5-7, but set StpOffset to 2 this time.
10. The Arp starts with note 3, and then repeats notes 1-3.

When 3 notes are being held a StpOffset value of 3 sounds the same an offset of 0, 6, or 9 (and all other multiples of 3). But when 4 notes are held a StpOffset of 3 starts with note 4, and then repeats notes 1-4. In that case, all StpOffset values that are multiples of 4 sound the same.

In the next example you'll see how the Offset works within the boundaries of the Length parameter. Starting with an Init patch and Arp off:

1. On Arp Edit page 1, use Control knob 7 to set Mode to Phrase.
2. While you're on page 1, set Length to 16 steps.
3. On Arp Edit page 2 select phrase 14, which has 32 steps.
4. Play a note. You'll hear the Arp phrase play steps 1-16 and repeat.
5. Now set the Step Offset to 8 using Control knob 8.
6. Play a note. You'll hear the Arp phrase play steps 9-16, then repeat steps 1-16 until you release the note.

In item 5 above a StpOffset value of 8 or -8 yields the same results, because each makes the phrase start at the halfway point of the 16-step pattern. So either way, the phrase starts on step 9.

See *The Phrases (p. 118)* for a transcription of each phrase.

Additional Arp Features

Latch and Sustain

Press [LATCH] to activate Latch mode. This enables you to take your fingers off the keyboard and use both hands to adjust parameters. It works whether an arpeggio is running or not.

Use [SHIFT] + [LATCH] to activate Sustain mode. This also works whether an arpeggio is running or not. It's the same response as using a sustain pedal.

Between these two parameters there are four potential combinations, as shown in the chart. The status of the [LATCH] button LED provides a visual clue as to which settings are active.

Latch	Sustain	[LATCH] LED status
On	Off	Button lit constantly
On	On	Flashing cycle: 0.8s lit, 0.2s unlit
Off	On	Flashing cycle: 0.5s lit, 0.5s unlit
Off	Off	Button dimly lit

Initialize the Arp

Hold [INIT] and press the [ON] button to initialize the Arpeggiator module. All parameters will return to their defaults.

The Arpeggiator & MIDI

The setting of *Arp TX (p. 109)* determines whether the arpeggiator will transmit notes or respond to incoming notes via MIDI / USB. These two states are mutually exclusive. The following table illustrates the basic capabilities of the Arp TX settings.

Arp TX setting	On	Off
MIDI/USB outputs will transmit the arpeggiator notes	Yes	No
Latch button will latch outgoing MIDI notes [1]	Yes	No
Incoming MIDI/USB notes will trigger and outline an arpeggio	No	Yes
Incoming MIDI/USB notes can be latched by the Latch button [1]	No	Yes
Arpeggiator can be triggered and/or latched locally	Yes	Yes
[SHIFT] + [LATCH], Sustain pedal will sustain incoming/outgoing MIDI/USB notes	Yes	Yes

[1] [LATCH] has the same effect on notes whether the arpeggiator is running or not.

Macros are powerful, expressive tools for song creation and live performance. Every Single mode patch can have up to 8 Macros, so a Multi has access to as many as 16 of them.

Each Macro is a combination of one of the Control knob / button pairs and a list of destinations, sort of like a private Mod Matrix grouped around the Right display. In fact, Macros can even control the Mod Matrix mod routes (and vice versa).

For the sake of simplicity, in this section we will assume the Hydrasynth Deluxe is in Single mode. Details about using the Macros in Multi mode are provided in *How to route a Macro (p. 27)*.

Home Page

If you haven't tried out the Macro controls yet, press the [HOME] button to jump to the Home page. That's where the action is: the Control knobs and buttons are supercharged on this page, sort of like the pedals on steroids. Each Control knob is paired with a Control button to affect up to 8 parameters at once: The knobs sweep parameter values and the buttons toggle, trigger, or reset them; see *Master: Page 2 (p. 102)*. Modulation levels can be positive or negative, so a Macro can reduce values, increase them, or do both at the same time.

It's easy to see which Macros are active on the Home page: If a Macro field displays a zero or some other number, it has at least one parameter assigned. If the Macro field has a dash, not a number, then it is empty.

Here's a handy tip when using Macros on the Home page: If you hold [INIT] and turn a Control knob, the Macro will jump to 0.0 from its current value. This prevents the generation of intermediate values.

The Macro button is exclusive; when it is engaged the Control knob is locked out temporarily. This allows you to change the Control knob "behind the scenes", so that the new Macro value is revealed after disengaging the Macro button.

Make a Macro

Find a fun patch, press [MACRO ASSIGN], and let's explore how they work. At this point all eight Macros show their names and "Edit…" whether they're empty or not. From here you can inspect or modify an existing Macro by pressing its Control button to enter the Macro Edit page. After that, here's what you'll see in the Right display:

- Destinations 1-3 are listed across the top row. Use the Page arrows to select Des 4-6 and Des 7-8.
- The middle line of the page shows the Button Value.
- The bottom line of the display shows the modulation Depth for the knob.

Assign a Destination

For the purposes of this exercise, let's start with an empty Macro. We'll be working with Macro 1.

Additional information for some steps is included below in italics.

1. If you're not already there, press [MACRO ASSIGN].
2. Hold [INIT] and press Control button 1 to initialize Macro 1.
3. Release [INIT] and press Control button 1 again to enter the Macro Assign page.
4. Press Control button 2 to activate the Assign function.

   Many of the colored Access buttons are lit now; these are potential destinations.

5. For this example, press [OSC 1] to select it. Instantly the first column is populated with Osc 1, Pitch, and zeroes.
6. Turn Control knob 6 to set an amount of 120.0. Use [SHIFT] to fine-tune the value.
7. Press Control button 6 to reach the Button Value field.

   The bottom Control button cycles through all of the fields, and also escapes the value fields.

   The Module buttons cannot change the page when a highlight cursor is visible.
8. Use Control knob 2 and [SHIFT] to set a value of 20.0.

   The upper Control knob always edits the highlighted field.
9. Hold a note and use Control knob 5 and Control button 5 to audition the Macro. All 8 routes will respond.

   The Macro knob/button pair you are editing will behave this way on the Home page.
10. With these settings the knob sweeps an octave; the button jumps a whole step.

    The MacroBtn parameter on System Setup page 2 defines the behavior of the Macro buttons: If the setting is "Trigger" or "Reset" the button is a Trigger. When set to "Toggle" or "Switch," the button behaves as a Toggle.

When controlling a Mod route with a Macro, keep this in mind: If the Mod route Depth = 0 and the Macro Depth is +128, the first half of the Macro knob range will cover the entire mod range (0-128) and the last half of the Macro knob range won't do anything. But if the Mod route depth is -128, the Macro knob can cover the full range from -128 to +128 and there is no dead zone.

Name the Macro

Macros can be given a name with up to 8 characters, so you'll know at a glance what the Macro does. The name is displayed on the Home page and on the Macro Assign page. Here's what to do:

1. From the Home page, press [MACRO ASSIGN].
2. Select the Macro you want to edit by pressing its Control button.
3. Use the Page arrows or [MACRO ASSIGN] to reach page 4.
4. Control knob 1 selects the naming function: List name or Custom name.
5. **List name:** Use Control knob 2 to choose a preset name. There are 100+ of them; see *Preset Macro Name List (p. 89)* at the bottom of this chapter.
6. **Custom name:** Control knob 2 chooses characters; use Control button 2 to select the next character.

Macro Slot Copy

There's a quick way to set up as many as three complementary routes within a Macro, as long as they're on the same Destination page.

1. Press [MACRO ASSIGN] to access the Macro Assign page.
2. Press the Control button of the desired Macro to enter its Destination page.
3. Press and hold the top or bottom Control button of the copy source.
   Note: The destination Macro slot must be on the same page as the copy source.
4. The top and bottom Control buttons for the other two slots are flashing. Press one of those to paste the settings to that Macro slot.
5. The Destination Group & Parameter are copied to the target slot; Button Value & Depth are set to default values.
6. Make adjustments to the Destination, Button Value and Depth parameters as needed.

Save the Patch: Macro Options

The [SAVE] button has its own chapter, but we want point out this part of it now. While saving the patch, Control knob 4 lets you specify whether the current positions of the Macro knobs will be returned to zero (Return) or stored in their current positions (Save). And in Single mode there's a third option that translates the Macro knob positions into new values for the parameters they control (Convert). For more information see *Patch Management (p. 97)*.

Macro Button Response

There's a separate chapter for *The System Setup Pages (p. 101)*, but this information affects how the Macro buttons behave on the Home page and while auditioning a Macro during editing.

To access the Macro Button settings, press [SYSTEM SETUP] and press the Page Down arrow once to reach page 2. Use Control knob 4 to select one of the four options: Toggle, Trigger, Switch, and Reset.

- **Toggle**: The Macro button toggles between the Button Value setting and the current Macro knob value.
- **Trigger**: The Macro button triggers the Button Value On when pressed and Off when released.
- **Switch**: Only one Macro button can be selected at a time.
- **Reset**: The Macro button resets the corresponding Macro Knob to zero

Using a Macro button on the Home page while holding [SHIFT] changes the behavior.

When MacroBtn setting is...	**[SHIFT] + Macro button response is...**
Toggle	Trigger the Button Value On when pressed and Off when released.
Trigger	Hold the Button Value setting until released manually
Switch	Allow more than one Macro Button to be selected
Reset	(no response)

Preset Macro Name List

These are the preset Macro names found on Macro Edit page 4. You can also create your own Macro names; see *Name the Macro (p. 87)*.

Macro name	Macro name	Macro name	Macro name	Macro name
2nd	Crystal	Harmony	Phrase	Stretch
3rd	Cutoff	Hurt	Pitch	Sub
4th	CV 1	Itch	Pressure	Swing
5th	CV 2	Jianbing	PulsWdth	Teardown
6th	Darken	Level	Purr	Thicken
7th	Decay	LFO Amt	PWM	Thin
Air	Delay	Mai Tai	Range	Time
Amp	Depth	Major	Ratchet	TimeDiv
ArpMode	Distort	MakeHuge	Rate	Twist
Attack	Dry/Wet	Mangle	Ratio	Velocity
Bacon	Env Amt	Massage	Release	Vowel
Bark	EQ - Hi	MIDI CC	Reso	Warp
BassDrop	EQ - Low	Minor	Reverb	Wavescan
Beef	EQ - Mid	Mod 1	RingMod	WavStack
Bend	Fast	Mod 2	Rotary	Width
Bite	Feedback	Mod Amt	Rumble	Wobble
Bleed	Filter	Morph	Scratch	Woof
Breath	Flanger	Noise	Slow	Wow
Brighten	FM	Oct -	Snarl	-
Buildup	Force	Oct +	Space	-
Chance	Funk	Oh	Speed	-
Chord	GateTime	Ouch	Spin	-
Chorus	Glide	Overdriv	Spread	-
Compres	Go	Pan	Stank	-
Crunch	Harmonic	Phase	Stop	-

Modular synthesizers use cables to make connections. Hydrasynth Deluxe has a neater solution: an easy-to-use internal patch bay with 32 sets of modulation sources and destinations.

Creating Mod Routes

There are three ways to create a new mod route in the Mod Matrix. The first is to access the Mod Matrix page directly. *Additional notes are entered below some steps in italics.*

The Whole Process

1. Press [MOD MATRIX] to access the Mod Matrix page.
2. Press one of the Control buttons for the desired slot (top or bottom) to enter assign mode.

   The colored buttons that are most brightly lit are the available source modules.
3. Scroll the top Control knob to select a source.

   Shortcut 1: Hold [SHIFT] while turning the Control knob to jump through modules by category.

   Shortcut 2: Press the desired module button to select it.
4. Press the bottom Control button to access the destination field.

   The orange-lettered buttons are now lit; these are the available modules.
5. Scroll the top Control knob to select the destination module. Its default parameters appear in rows 2-4.

   Shortcut 1: Hold [SHIFT] while turning the Control knob to jump through modules by category.

   Shortcut 2: Press the desired module button to select it.

   Shortcut 3: Turn one of the top-panel knobs to select that parameter.
6. Press the bottom Control button to access the next row.
7. Scroll the top Control knob to change the destination parameter...

   ...unless you used Shortcut 3 in step 5 already.
8. Press the bottom Control button to exit assign mode.
9. The bottom Control knob can change the modulation depth at any time during steps 3-8.

The Shortcut

Mod routes can be established quickly from almost any page:

1. Press and hold the module button for the *Modulation Sources (p. 92)*.
2. Press the module button for the *Modulation Destinations (p. 93)*.

   The Mod Matrix opens at the first available slot with the first parameter of the destination module highlighted.
3. To select a different target parameter from that module, use the bottom Control button to enter the next field.

   Shortcut: If the parameter has a top-panel knob, turn it to select that destination.
4. Use the upper Control knob to select the desired parameter.
5. Use the Control knob on the bottom row to set the modulation amount.

   The modulation amount can be positive or negative.

The shortcut method works inside and outside of the Mod Matrix page. The difference: Inside the Mod Matrix the available destination module buttons light up when the source module button is held. Outside the Mod Matrix they don't.

Direct Assignment

Mod routes can be established between a source and a specific parameter using this method. After you access the page with the parameter to be modulated, hold the modulation source button and press the Control button next to the parameter in the Right display. This creates a link between the source and destination in the fewest possible number of steps.

For example, here's how to route ENV 5 to the LFO 1 Amount of Filter 1:

- Press [FILTER 1] to access that module.
- Press and hold [ENV 5] to select it as the mod source.
- Press Control button 6 to select LFO1amt as the destination.
- The mod route ENV 5 to Filter 1's LFO 1 Amount is created.
- Use the Control knob on the bottom row to set the modulation amount, and you're done!

Notes About Mod Routes

Here are some concepts to keep in mind while working with Mod Routes:

- Some modules cannot be modulation sources, such as Oscillators or Mutants.
- Some modules can be sources and destinations, such as Envelopes and LFOs. With these, the order in which you press them determines the source and the destination.
- Not all destinations can respond to polyphonic sources with independent modulation per note. For example, routing PolyAT to Reverb Time won't give different reverb times for each note. The latest input value overrides all previous values.
- Only the first two parameters and the Wet/Dry mix of the Pre-/Post-FX can be modulated.
- Some modules only have one parameter that can be modulated, such as the Ring-Noise module; in this case, there is nothing else for the upper Control knob to select when that field is highlighted.
- The Ribbon offers three different sources via the Mod Matrix. If you want to use a different one move the cursor to Source field and select it. For a description of each source see *Ribbon Controller (p. 80)*.

If all 32 modulation routes are occupied and you try to add another, the Left display will show a message for two seconds that says "Mod Matrix Slots Full!"

More Shortcuts

Copy Mod X to Mod Y

You can copy one Mod matrix slot to another and make one or more derivative routes. But it won't work if a mod route field is highlighted; press [EXIT] first.

1. Hold the Control button of the source route.
2. **Warning!** The next step will replace what's there, so choose an empty slot.
3. Press the Control button of the destination route.
4. Modify the destination module, parameter, and depth as needed.

Clear a Mod Slot

To clear a single Mod matrix slot, hold [INIT] and press its top Control button.

Clear the Entire Mod Matrix

If you want to start over with all new mod routes, hold [INIT] and press the [MOD MATRIX] button. A prompt will ask you to confirm the decision, because it's a big one. If you're sure, press [INIT] again.

Be Random

If you're looking for something crazy, randomize the entire Mod Matrix! You might get lucky or you might get nothing. You can always try again!

Before you do, though, try a few mod sources: the wheels, the ribbon controller, start the arpeggiator, etc. There could be a hidden gem there. And once you get something interesting, dial in a few changes to make it perfect. It's okay, you can take all the credit! You're the one who saw what was cool about it; we just rolled the dice.

Modulation Sources

These are the mod sources available in the Hydrasynth Deluxe. A few may need explanation; see below the chart.

Group	Modulators
Env	Env 1, Env 2, Env 3, Env 4, Env 5
LFO [1]	LFO 1, LFO 2, LFO 3, LFO 4, LFO 5, LFO 1+, LFO 2+, LFO 3+, LFO 4+, LFO 5+
Aftertouch	MonoAftT (Channel Aftertouch), PolyAftT (Polyphonic Aftertouch)
Keytrack	Keytrack (center note = C4 for all mod sources except filter keytrack [center = C2])
Velocity	Velo On (Note On velocity), Velo Off (Note Off velocity)
Wheel	PitchWhl (Pitch wheel), ModWhl (Modulation wheel)
Ribbon [2]	RbnAbs (Ribbon Absolute bipolar), RbnAbs+ (Ribbon Absolute unipolar), RbnRel (Ribbon Relative)
Pedal	ExpPedal (Expression pedal), SusPedal (Sustain pedal)
CV	Mod In 1, Mod In 2
MPE [3]	MPE-X, MPE-Yabs, MPE-Yrel
Voice [4]	VoiceMod, VoiceMd+
MIDI	CC [000-127]

[1] An LFO is normally a bipolar source. A plus sign [+] indicates a unipolar source derived from that LFO.

[2] See *The Ribbon as a Mod Source (p. 81)* for a description of each mode.

[3] MPE-X = pitch bend
MPE-Yabs = CC# 74 in some devices (absolute mode)
MPE-Yrel = CC# 74 in some devices (relative mode)

[4] A plus sign [+] indicates a unipolar source derived from VoiceMod Edit.

Modulation Destinations

These are the potential mod destinations in the Hydrasynth Deluxe. A few may need explanation; see below the chart.

Group	Parameters
Arp	Mode, Division, Swing, Gate, Octave, OctMode, Length, Phrase, Ratchet, Chance
Osc 1–2 Osc 3 All Osc [1]	Pitch (+12/-12 semitones), Wave, WaveScan Pitch (+12/-12 semitones), Wave Pitch (+12/-12 semitones)
Mutator 1–4	Ratio, Depth, Window, Feedback, Dry/Wet, Warp [1-8]
Ring Mod	Depth
Mixer	Osc1Vol, Osc2Vol, Osc3Vol, RingVol, NoiseVol, Osc1Pan, Osc2Pan, Osc3Pan, RingPan, NoisePan, Osc1F1/2, Osc2F1/2, Osc3F1/2, RingF1/2, NoisF1/2
Filter 1 Filter 2	Cutoff, Resonance, Drive, Control, ENV1amt, LFO1amt, Keytrack Morph, Cutoff, Resonance, ENV1amt, LFO1amt, Keytrack
Amp	LFO2Amt, Level
Pre-FX Delay Reverb Post-FX	Param1, Param2, Dry/Wet Time, Feedback, Wet Tone, FeedTone, Dry/Wet Time, Tone, HiDamp, LoDamp, Dry/Wet Param1, Param2, Dry/Wet
Env 1–5	Attack, Hold, Decay, Sustain, Release
LFO 1–5	Rate, Level
ModMtrx [2]	Depth [1-32]
Macro	Macro 1– Macro 8
Voice	Detune, AnalogFL, PitchBnd, Vib Amt, Vib Rate, GlidTime
CV	ModOut 1, ModOut 2
MIDI [3]	CC [000-127]

[1] All Osc: A mod route can be applied to all three oscillators simultaneously.

[2] ModMtrx: A source can modulate the depth of any mod route. “Depth 1” targets mod route 1, etc.

[3] MIDI CC #: Incoming MIDI data can modulate certain parameters, and they can return the favor.

The seven CV/Gate connectors have a longer history in the music world than MIDI does! This is how the modules of early synthesizers were connected, using cables to carry the control voltages, gate triggers, and clock signals. And the resurgence of modular synths and Eurorack modules in the 21st century has brought these connection protocols back to the forefront of the music creation process for many musicians.

Hydrasynth Deluxe is well-stocked in this area too, with two CV inputs and three CV outputs, plus a Gate Out connector and another that transmits clock signals. Each CV/Gate connector can be configured to match the voltages and signal types of the most popular formats.

Basic Concepts

If you're new to the world of CVs and Gates, here are a few descriptions and ideas on how to put this stuff to work.

First, "CV" stands for "Control Voltage". It's a quick way to say "Use a change in this voltage value to control that device." A "gate" is something that opens and shuts, allowing the passage of electricity and preventing it, respectively. In practical terms, when a note is triggered by a key, Hydrasynth Deluxe generates a CV (Pitch) and two Gate voltages (high and low, for "Note on" and "Note off").

This is done by converting digital data into analog voltages, which are then regulated by the System Setup preferences and supplied to the CV/Gate/Clock connectors. Likewise, incoming CVs are translated into digital data and supplied to the Hydrasynth Deluxe, which taps into them via the Mod Matrix.

It's a two-way street, with the Mod Matrix as the "traffic cop": you can route the CVs from Mod 1 and Mod 2 to any mod destination, and route any mod source to Mod 1 and Mod 2, all at the direction of the Mod Matrix. In other words, the keys, wheels, ribbon, expression pedal, even incoming MIDI data can be routed to the inputs of a modular synthesizer through the CV/Gate section.

And in the other direction, just imagine: The incoming voltage could be generated by some crazy Eurorack module and used as a complex source to modulate a Hydrasynth Deluxe parameter. There has never been a better time to own a synth!

A Few More...

CV/Gate Polyphony

CV connectors are naturally monophonic, so they work best with monophonic patches. Note that they are triggered by the Upper part in Multi mode.

For the best results set Polyphony to Mono or Unison on *Voice Parameters: page 1 (p. 73)*. To trigger the CV outs with a polyphonic patch, set the StMode to Alter on the same page.

The Ribbon and CVs

There's an option on *CV – Pitch Gate: Page 8 (p. 110)* that selects whether the keyboard or the ribbon will be the CV/Gate source. This is an ideal pairing, since the ribbon is naturally monophonic also. For even better results, set the ribbon to *Theremin Mode (p. 80)* and activate its Quantize parameter so its output will conform to the selected Scale. Then play the ribbon with one hand, the keyboard with the other, and it's literally like having two instruments in one!

Clocks and Sync

The arpeggiator can drive or be driven by external sequencers. (See *The Arpeggiator & MIDI (p. 85)* for more info). Set BPM Sync to On elsewhere too (LFOs, Envelopes, and Delay). The Clock connector in the CV/Gate section can send one of several sync rates to non-MIDI devices, as can the MIDI and USB ports. But incoming clocks must arrive via USB or MIDI. These options are set on *The System Setup Pages (p. 101)*.

Compatibility

There are several voltage standards that companies use, so the Hydrasynth Deluxe allows you to set the voltage ranges to match the source device. Those are defined on System Setup pages 8–10. More later about that.

Output Connectors

The output connectors (Pitch, Gate, Mod 1, Mod 2, and Clock) convert data from the Hydrasynth Deluxe into voltages, which can then be used to trigger notes and control parameters on an external device. Note that the same voltages are sent in Single mode and Multi mode.

Each of the five output connectors has a different purpose.

Pitch

A control voltage from this connector is intended to control the pitch on an external device. The output voltage is derived from the MIDI note number that corresponds to the key being played. This output is monophonic, so for the best results use one of the Mono or Unison options. A description of each of those modes and their note priority variations is available in the *Polyphony settings (p. 73)*. The voltage ranges for this output are defined on *CV – Pitch Gate: Page 8 (p. 110)*.

Gate

When a key is played, two Gate signals are generated: Gate high (note played) and Gate low (note released). The same signals are sent by the Tap Tempo button for each held note when the Tap Trig parameter is active on Arp Edit page 2.

Gate signals are normally transmitted to the same device that receives the control voltages generated by the Pitch output, and will conform to the note priority settings. Two types of gate signals are available (V-trig or S-trig); please refer to the documentation for the external device so you'll know which type to use.

The settings for this output are defined on *CV – Pitch Gate: Page 8 (p. 110)*.

Mod 1 and 2

These are also control voltage outputs. They can be used to modulate almost anything on a modular synth, but a common scenario is to route Mod 1 to a VCA (Voltage Controlled Amplifier) and Mod 2 to a VCF (Voltage Controlled Filter). The combined use of these two outputs and the Pitch/Gate outputs enable the Hydrasynth Deluxe to control the entire signal path of an external monophonic device from start to finish.

The settings for these outputs are defined on *CV – Mods: Page 10 (p. 111)*.

Clock

As stated earlier, four different sync rates are available for this connector. This selection and those for three related parameters are found and explained on *CV – Clock: Page 9 (p. 110)*.

Input Connectors

Mod 1 and 2 are equally capable: they can be used as modulation sources to control any parameter that is a Mod Matrix destination. They can be set to independent voltage ranges, though, which expands their capabilities even further.

The settings for these inputs are defined on *CV – Mods: Page 10 (p. 111)*.

Esoteric Uses

These are a few ideas that will take you beyond the basics of using the CV/Gate connectors. We'll refer to Mod 1 in the following examples, but the statements apply equally to Mod 2.

CV Attentuator

You can create a CV attenuator or CV booster by routing Mod In 1 to ModOut 1 in the Mod Matrix. The amount of boost or cut is determined by the mod route Depth setting. The best results require matching the Mod 1 input and output settings on *CV – Mods: Page 10 (p. 111)*.

CV Inverter

You can also use the CV/Gate section as a CV inverter, though this involves both Mod 1 and Mod 2. For example, as the mod source use Mod In 1, as the mod destination use CV / ModOut 2, and then set Depth to a negative amount.

Process Audio

As mentioned in the Oscillator chapter, the *Mutants 1–4 (p. 43)* can process audio signals that arrive at the CV Mod Inputs. Refer to the notes in the FM-Lin and Ring Modulator sections of that chapter for more details.

CVs and Arpeggios

The Hydrasynth Deluxe arpeggiator can be used to modulate external devices, too. When the arpeggiator plays a note it's the same as playing the keyboard manually: each note sends a Pitch CV and Gate signal. Again, for the best results use a monophonic voice mode (see *Polyphony settings (p. 73)*). To use the arpeggiator with a polyphonic patch, set the StMode to Alter on *Voice Parameters: page 1 (p. 73)*.

The process of saving a patch and finding it later are closely related, so both are covered in this chapter. The concepts and operations are almost identical for Single mode and Multi mode except as noted.

Using the Browser

Whether you're hunting for a specific patch or looking for something in a particular category, the Browser has several features that will help you quickly locate what you need.

The Browse page

Press the [BROWSE] button to reveal these features:

Control knob	Parameter	Range	Description
1	Patch select	Single mode: 8 banks x 128 patches (A-H); 10 read-only banks x 128 patches (M1-M5 Upper, M1-M5 Lower) Multi mode: 5 banks x 128 patches (M1-M5)	Scroll to select; [SHIFT] + left/ right arrows jump +/- 10; [SHIFT] + scroll to jump banks [1];
2	Patch name	(view only)	Shows name of selected patch
3	Category	(view only) [2]	Lead, Pad, Bass, etc.
4	Find By	Patch #, Name, Category	Sorting method (see below)
5	Bank [3]	Single A-H, MultiM1U-MultiM5L	Jump to adjacent bank
6	Compare [4]	(same as Patch select)	Compare active patch to another
8	Favorite Assign	(access)	Press Control button 8 to assign Favorites [5]

[1] When set to Find by Patch #; otherwise jump +/- 10

[2] Control knob 3 is only active when the Find By option is set to Category.

[3] The Bank parameter is hidden when the Find By option is set to Category.

[4] Single mode only.

[5] Patches are assigned to the Favorites banks on this page. Use [SHIFT] + [BROWSE] to access current Favorites.

Browsing is fairly simple. This page presents all of the main functions:

- Turn Control knob 1 to select a patch (or use the big knob).
- Turn Control knob 5 to jump to a specific bank (Single A-H, MultiM1U-MultiM5L).
- Basic information about each patch is shown in fields 2 and 3.
- The patches will appear in a different order depending on the "Find By" selection.
- Use [SHIFT] + the Left/Right arrows to skip through the list 10 patches at a time.

The Compare and Favorite Assign features are described later in this chapter.

Sort Methods

Patches can be sorted three ways. The patches don't move, they're just shown in a different order. This affects the Browser and the Home page: it determines the number of patches that can be selected, and the order in which they appear.

Find by Patch

This puts the patches in order first by the Bank they occupy, then in numerical order within the Banks. The Banks are arranged like this:

- Single mode (writable): A001 to H128
- Single mode (read only):
  M1-001U to M5-128U
  M1-001L to M5-128L
- Multi mode (writable): M1-001 to M5-128

Find by Name

This option puts all of the patches in alphabetical order. As Control knob 1 or the Patch knob are turned the patch Bank and number might jump around; this is because the patches are still in their original locations. They are not relocated when the Find By option is changed.

Find by Category

This sorts the patches by their categories (Arp, Bass, FX, etc.). The categories are listed in alphabetical order; use Control knob 3 to scroll through them. Note that Control knob 3 is only active when Find By Category is selected.

Control knob 1 or the Patch knob are used to select individual patches within the selected category. As they are turned the patch Bank and number might jump around a lot; this is because the patches are not relocated when the Find By option is changed.

Compare

The patch shown in edit field 6 can be used to compare the current state of an edited patch with its unedited version (the default selection) or with any other Hydrasynth patch of the same type (Single or Multi).

Control knob 6 is used to scroll through the patches, which are always displayed here in their original order (by Bank and number). To jump through that list 10 patches at a time, hold [SHIFT] while turning Control knob 6.

Once the desired patch number appears in edit field 6, use Control button 6 to make the patch active. Toggle that button as often as needed to compare it to the edited patch. Note that temporary edits can be made to the comparison patch, but those edits will be lost as soon as Control button 6 is toggled back to the patch being edited.

Favorite Assign...

It can be useful to group certain patches together without having to relocate them. This feature lets you designate certain patches as Favorites, which makes them easy to find later.

There are 16 banks of Favorites, with 8 patches in each. You can put a patch in several locations if you'll need it more than once during a performance, for example.

Favorites are *not* selected from inside the Favorites Assign page; this will be explained shortly. So the first step is to select the desired patch on the Home page. After that, here's how to add that patch to the Favorites list.

1. Press [BROWSE].
2. Press Control button 8 to access the Favorite Assign page.
3. To assign that patch to the first Favorites slot, press Control button 1.

   The LED ring will flash quickly to confirm the assignment.
4. Use the Down/Up arrows to select the next group of 8 patches, if the current patch belongs there too.

   The Left display indicates which of the 16 groups is selected.
5. Return to the Home page to select another patch, then repeat steps 1-4 to place it in a Favorites group.
6. Repeat steps 1-5 until the groups are full.

During steps 1-6 above the Patch knob and the Left/Right arrows are disabled. This helps prevent the accidental replacement of a Favorite within one of the groups.

You can play any Upper/Lower patch with all 16 voices if you put it into your Favorites. Just access it from Single mode and follow steps 1-5 above.

Browse Favorites

Your Favorite patches can be accessed from any other page.

- Hold [SHIFT] and press [BROWSE] to access the Favorites.
- Use the Page Down/Up arrows to move between the 16 groups of Favorites. If the desired group is > 8 pages away, hold [SHIFT] and press Page Down/Up to jump to group 1 or 16, then use the Page buttons to reach the exact group.
- Press one of the Control buttons to select a patch within the current group.

  The Control button and the display field for the active patch are brightly lit.

Save the Patch

Patch Protection

There's a Protect setting in System Setup that is on by default. So the first time the [SAVE] button is pressed the Left display might show the message "Protection is On!" This will need to be disabled before a patch can be saved.

It's easy to find: press [SYSTEM SETUP] and the first page will appear. The Protect feature is in edit field 4. Turn Control knob 4 to deactivate or reactivate the feature. Press [EXIT] and the setting will be saved. Note: This setting is remembered when power is turned off.

If you know you'll be using the Hydrasynth somewhere that a curious person might have access to it, it's probably a good idea to turn Protect back to On. This is a simple thing to change, and it could prevent the loss of an important patch later.

The Save page

If Protect is Off, press the [SAVE] button to open the menu. Everything is on one page:

Control	Parameter	Range	Description
1	Select target location	Single mode: A001 to H128 [1] Multi mode: M1-001 to M5-128	Scroll to select; [SHIFT] + scroll to jump +/- 10
2	Patch name	Numbers, letters, symbols	Select up to 16 characters (see below)
3	Category	(various)	Choose patch category (Arp, Bass, FX, etc.)
4	Macro options	Return, Save, Convert [2]	Process current Macro values (see below)
5	Bank	Single A-H	Jump to adjacent bank
6	Name of current target	(in memory)	This patch will be replaced if you [SAVE]
8	Color	32 colors	Select LED color for wheels, Patch knob

[1] Some patch locations are read only in Single mode (M1-001U to M5-128U and M1-001L to M5-128L). These are used as Upper/Lower patches in Multi mode and cannot be overwritten here. If you try to save a Single mode patch to these locations the Left display will show the message "Cannot save".

[2] The Convert option is not available in Multi mode.

It's fairly easy to save a patch. This page presents all of the main functions:

- Use Control knobs 1 and 5 to select a location and bank for the patch (the Patch knob and arrows are disabled).

  Use [SHIFT] + Control knob 1 to skip through the list 10 patches at a time.
- Give the patch a name up to 16 characters long. This is described in the next section.
- Select one of the preset patch categories with Control knob 3.
- Decide what will happen with the current Macro settings when the patch is saved (descriptions below).
- Choose one of 32 colors for the LEDs under the wheels and the Patch knob.

Name the Patch

The naming of a patch happens in edit field 2. The current character is highlighted. Turn Control knob 2 to select a character. Use [SHIFT] + Control knob 2 to select the first character of the next character group: blank, 0-9, A-Z, a-z, and other characters (!, #, +, -, etc.).

Press Control button 2 to advance to the next character field. Use [SHIFT] + Control button 2 to select the previous character field.

Select a Category

Turn Control knob 3 to select one of the preset patch categories.

Macro Options

Control knob 4 lets you decide what will happen with the current settings of the Macro knobs and buttons when the patch is saved.

Return

This option returns all Macro knobs to zero and sets the Macro buttons to Off.

Save

This option preserves the positions of all Macro knobs and the status of all Macro buttons (On or Off).

Convert

This option converts the positions of all Macro knobs and buttons into new values for the parameters they control.

Here's what else happens with the Macro Convert option:

- After the patch is saved, the depth of all Macro knobs returns to zero and all buttons are set to Off.
- If the current relative value of a parameter exceeds that parameter's range, the value will be limited to the lowest or highest possible value depending on its current state. The Left display will show a warning when this is true.
- External CV and MIDI parameters under Macro control will be returned to their zero values.

Note: The Convert option is not available in Multi mode.

Choose a Color

As an added degree of personal touch, you can choose from 32 different colors for each patch when saving. The selection affects the LEDs under the Patch knob, the Pitch wheel, and the Mod wheel. The selected wheel colors will vary within that color as the wheels are used.

Patch Backup

Whenever you get to the point where you'd hate to lose something you've created on the Hydrasynth Deluxe, be it a patch or a list of Favorites, that's the time to back them up to your computer.

Our free Hydrasynth Manager application is the best way to do this: It will send or receive a single patch, several patches, a full bank, or the entire memory quickly and easily. You'll find Hydrasynth Manager at *https://www.ashunsoundmachines.com/downloads*.

Operational Notes

Navigation

The System Setup pages work the same way all other modules do, but here are some reminders:

- To access the next or previous page, use the Page Down / Up arrows.
- Cycle forward to the desired page quickly by pressing [SYSTEM SETUP] repeatedly.
- Use [SHIFT] + the Page Down / Up arrows to jump to the last page or back to the first page.

Access, Action

- Some fields have Control buttons that execute a function, such as the Factory Reset. These are indicated by the word (action) in the charts.
- Some pages have access buttons that open another page. These are indicated by the word (access) in the charts. Follow the instructions in the Left display to calibrate the selected item.

Saving the Settings

Press [EXIT] or any module button to save System Setup changes. The message "System saving..." will be shown in the Left display for about 1 second. Note that sound output is silenced while the settings are being saved.

Save System State

You can specify which patch you see first when the Hydrasynth is powered up. It's a simple process:

- Select your favorite patch (that's the hard part).
- Hold [SAVE] and press [SYSTEM SETUP].
- The display shows "STATE SAVED!" to confirm the action.

Master: Page 1

Control knob	Function	Range	Description
1	Transpose	- / +11 semitones	Transpose keyboard chromatically
2	Tuning	380 to 500 Hz	Sets center tuning frequency
3	O'Scope	On, Off	Toggles waveform animation in Left display
4	Memory protect	On, Off	Prevents overwriting of patches
5	Left contrast	0 to 127	Sets contrast for Left display
6	Right contrast	0 to 127	Sets contrast for Right display
7	Light menu	(access)	LED brightness for various sections, LED colors for Upper/Lower parts
8	Light show	Off, 10 / 30 seconds, 1 / 5 / 15 / 30 minutes	Sets timeout period for onset of light show

Light Menu

The Light menu lets you set independent brightness levels for the Tap Tempo LED, the Patch knob & wheels, and all other LEDS as a group. It is also where the color selections are made for the Upper/Lower parts.

- Press [SYSTEM SETUP].
- Press Control button 7 to enter the Light Menu.
- Use Control knobs 1-3 to set the brightness levels and select the Upper/Lower colors as shown in this table.

Control knob	Parameter	Settings	Description
1	LED Dim	On, Off	Dims all LEDs except Patch knob, wheels, Tap Tempo button
2	Patch Dim	Off, Dim 1-4, Kill	Controls the Patch knob LED ring and the wheel LEDs
3	Tap Dim	Off, Dim 1-4, Kill	Controls the Tap Tempo button brilliance
5	Lo Color	1–32	Sets color for Lower patch
6	Up Color	1–32	Sets color for Upper patch

The LED levels change as each value is selected so you can set the proper lighting for the current environment.

Lo / Up Color

These two settings let you customize what the color will for the Lower and Upper part select buttons. The selected color will be applied to all of the Access module buttons when one of these parts is selected. The color options are identical to those offered in *The Save page (p. 99)*.

Master: Page 2

Control knob	Function	Settings	Description
1	Knob Mode	Absolute, Pickup, Scale	How Variable knobs edit values when moved
2	Knob Speed	Slow, Medium, Fast	Sets Control knob response speed
3	Tempo Lock	On, Off	Selects Global tempo or per-patch tempo
4	Macro Button	Toggle, Trigger, Switch, Reset	Determines behavior of Macro Buttons
5	Safe Edit	On, Off	Prevents accidental loss of edited patch
7	FxBypass Menu	(access)	Global bypass of specific FX modules in all patches
8	Microtun menu…	(access)	Opens Microtuning menu

Knob Mode

This setting governs the response of the *Variable knobs (p. 16)* in the Filter and Arpeggiator sections, not the *Selection knobs (p. 16)*.

- **Absolute**: the parameter value jumps to the physical position of the knob
- **Pickup**: the knob must pass through the parameter value before an edit will happen
- **Scale**: parameter value edit begins from the current knob position; the remaining throw of the knob covers the remaining range of the parameter. After the knob reaches its minimum or maximum position the parameter value range conforms to the physical position of the knob (see Absolute).

Knob Speed

This determines the response speed of the Control knobs only. It also affects the finer [SHIFT] + scroll movements. With a setting of **Slow** a full turn is required to cover the full parameter range; with a setting of Fast it takes less than half a turn, which can also sacrifice parameter resolution.

Tempo Lock

Each patch stores its own Tempo setting. Setting Tempo Lock to On enables the tempo to remain the same while selecting patches.

Macro Button

These settings are described in the *Macro Button Response (p. 88)* section of the Mastering the Macros chapter.

Safe Edit

With this parameter set to On, if you try to select another patch before saving an edited patch, a message will ask for confirmation first. If a Macro control was the only thing changed, the confirmation message will not be displayed.

Note: This does not prevent Hydrasynth Deluxe from responding to MIDI program changes.

FX Bypass Menu

There are times when you may need to defeat one or more of the active effects for all patches. Some effects are integral to the character of a patch, such as flange or distortion. On the other hand, some effects are useful for setting a creative mood, but are less desirable when tracking parts in a studio. For example, you might want to disable the reverb but keep the delay for its rhythmic contributions. However, if you want to change the song tempo later, a recorded delay could be problematic.

For maximum flexibility, Hydrasynth Deluxe has the ability to enable and disable the Pre-FX, Post-FX, Delay, and/or Reverb as needed. These settings are global; i.e., they affect all patches the same way.

- Press [SYSTEM SETUP] twice to access page 2.
- Press Control button 7 to enter the FxBypass Menu.
- Use Control knobs 1-4 to enable or disable the desired FX module. Their LED buttons toggle off and on to indicate the settings.

Control knob	Parameter	Settings
1	Pre-FX	On, Off [1]
2	Delay	On, Off
3	Reverb	On, Off
4	Post-FX	On, Off [1]

[1] A Pre-/Post-FX module can have its FX Type set to Bypass. That setting only affects the current patch, not all patches, so the module LED stays lit. See *Pre- and Post-FX (p. 67)* of the Effects chapter for more information.

Note that the FX Bypass settings affect the Main/Upper and Lower outputs the same way. For example, if the Delay is disabled here, it is disabled for all four outputs.

Microtuning Menu

The microtuning scale is selected on page 3 of *The Voice Module (p. 73)* menu. This section describes how to send and receive them.

After accessing the microtuning menu the following options are shown in the Right display:

Control	Parameter	Range	Description
Knob 1	Scale select	1–32	Selects the Microtuning scale location
2 (view only)	Scale name	1–16 characters	Define with third-party software (Scala, etc.)
Button 3	Receive Scale	(action)	Puts Hydrasynth into Scale Receive mode
Button 4	Send Scale	(action)	Press to send selected scale sys-ex from Hydrasynth Deluxe via MIDI / USB

Scale Select

Use this field to choose a location to receive the new scale or send its scale via MIDI/USB.

Scale Name

The scale name is shown in this field. It cannot be edited here. When creating your own scales, be sure to set the scale name in the third-party software before exporting it as an MTS file (MIDI Tuning Standard). In Scala, for example, the name is taken from the Description section for the scale, not from the file name. Note that Hydrasynth only uses the first 16 characters in the name.

Receive Scale

Press Control button 3 to put the Hydrasynth into sys-ex waiting mode. At this point, you can send the sys-ex scale file from your computer.

Send Scale

Press Control button 4 to send your scale via sys-ex.

Keys: Page 3

Control	Function	Settings	Description
1	Velocity	On, Fix 60 / 80 / 100 / 110 / 127	Select velocity response or fixed value
2	Velocity Curve	Very Soft, Soft, Medium, Hard, Very Hard, NeoSoft, Neo, NeoHard	Select velocity response
3	Aftertouch Delay	0-400 ms	(see description)
4	Aftertouch Fade	0-400 ms	(see description)
5	Aftertouch	On, Off	Toggle aftertouch sensitivity [1]
6	Aftertouch Curve	Softer through Harder (6 settings)	Select aftertouch response
7	Aftertouch Offset	- 4 to + 4	(see description)
8	Aftertouch Release	0-400 ms	(see description)

[1] This will also disable or enable polyphonic aftertouch.

Velocity settings

To disable keyboard velocity sensitivity, select a fixed value (Fix 60, Fix 80, etc.). This only affects local response and outgoing MIDI; incoming velocity response is unaffected.

Velocity Curve defines the amount of force needed to reach maximum velocity, and also the curve from zero to maximum. The Very Soft through Very Hard curves vary from exponential to logarithmic. Neo curves are based on a new velocity calculation that allows for a more sophisticated response.

Aftertouch settings

- Aftertouch **Delay**: the time that transpires between note on and the onset of aftertouch.
- Aftertouch **Fade**: the time it takes to ramp aftertouch to its current value from 0.
- Aftertouch **Curve**: determines the amount of force required to reach maximum aftertouch values.
- Aftertouch **Offset**: reduces the dynamic range of the aftertouch. Positive values set a higher minimum point, so it takes more pressure to start the aftertouch. Negative values set a lower maximum point, so it takes less pressure to reach the maximum aftertouch value.
- Aftertouch **Release**: more like a compressor than an envelope, this applies to all upwards movements. This can help avoid unwanted modulation "wobble" while pressure is applied, and can sustain even after note off.

MIDI: Page 4

Control with...	Function	Settings	Description
Knob 1	Clock Sync	Internal, USB, MIDI In, Auto	Clock source for Arp, LFOs, Envelopes, Delay FX (see below)
Knob 2	Local	On, Off [1]	Disconnect keyboard from internal engine
Knob 3	Sus pedal	+, -, Auto	Set polarity of sustain pedal or detect on power-up
Knob 6	Exp pedal	+, -	Set polarity of expression pedal
Button 7	Exp pedal set	(access)	Calibrate expression pedal
Knob 8	Exp pedal curve	Log, Lin, Sigmoid, Exp	Select response curve for expression pedal

[1] The Local On/Off setting is remembered when power is turned off.

Clock Sync

- **INT RUN**: selects Hydrasynth as the master tempo clock. Sync signals are sent to MIDI, USB, and the CV Clock output.
- **USB**: selects the DAW as the clock master. CV Clock signals are sent to the CV Clock output at the selected rate. Tempo cannot be changed from the Hydrasynth.
- **MIDI In**: slaves the Hydrasynth to incoming MIDI clock data. CV Clock signals are sent to the CV Clock output at the selected rate. Tempo cannot be changed from the Hydrasynth.
- **AUTO**: Hydrasynth sets the clock source automatically to the first source that arrives. If the clock signal is interrupted, another is selected. Order of priority: USB > MIDI > Internal.

Note: Hydrasynth cannot be synced to an incoming CV clock signal.

Local

When working with a DAW, setting Local to Off can prevent a MIDI loop. Most DAWs have the ability to prevent this also.

The Left display will alert you when Local = Off with a message during power-up and on the Home page.

Expression Pedal setup

Press Control button 7 to access the pedal calibration page. The Left display will prompt you to sweep the expression pedal through its full range.

MIDI: Page 5

Control	Function	Settings	Description
1	MIDITxRx	AsGlobal, Separate	Determines MIDI routing for Single & Multi modes
2	TXGlobal	Off, 1-16	Transmit channel for Single mode, Global operations
3	TX Lo	1-16 [1]	Transmit channel for Lower part
4	TX Up	1-16 [1]	Transmit channel for Upper part
6	RXGlobal	Omni, 1-1	Receive channel for Single/Multi modes, Global operations
7	RX Lo	Off, 1-16 [1]	Receive channel for Lower part
8	RX Up	Off, 1-16 [1]	Receive channel for Upper part

[1] TX Lo, TX Up, RX Lo, and RX Up are only visible when MIDITxRx = Separate.

You can configure the Upper/Lower parts to send and receive on different MIDI channels, or to send on the same MIDI channel as Single mode. The MIDITxRx setting determines this.

MIDI TX / RX = AsGlobal

With this option all MIDI data is transmitted on the TX Global channel and received on the RX Global channel, so the Upper/Lower channel selection fields are hidden. The Global TX / RX channel settings can be different.

In Multi mode the Upper/Lower parts send and receive MIDI as if they were a Single mode instrument; i.e., whether the Multi is in Dual mode or KeySplit mode, it transmits on and responds to the appropriate Global channels without being affected by the split points or crossfade settings. The Multis still respond to the split/crossfade settings when played from the keyboard.

RX Global can also be set to Omni, which means that the unit responds to incoming data on any MIDI channel whether it is in Single mode or Multi mode.

MIDI TX / RX = Separate

This option reveals MIDI channel settings for the Upper/Lower parts. The Tx and Rx channel assignments for a part do not need to match. The TX channels are mutually exclusive: For example, if TXGlobal = 1 that value is not available for the Upper/Lower parts; If TX Lo = 2 that value cannot be selected for TX Up; and so on.

RX Lo and RX Up are also mutually exclusive; if a value is selected for the RX Lo it cannot be selected for RX Up, and vice versa. RX Global can share a MIDI Receive channel with RX Lo or RX Up, but not both.

RX Global can also be set to Omni, which means that in Single mode the Hydrasynth Deluxe responds to MIDI data on any channel. If MIDITxRx is set to AsGlobal, Multi mode adopts the same MIDI Tx/Rx channels as Single mode (see the previous section).

Here's what to know about MIDITxRx = Separate:

- MIDI Bank select / Program change messages are sent on the Global TX channel, the same as when MIDITxRx = AsGlobal.
- The unit responds to Bank / Program changes on the RXGlobal, RX Lo, and RX Up channels. See the next section for details.
- When MIDI TxRx = Separate, both the Upper and Lower parts will respond to parameter and controller data that arrives on the Global channel. You'll also need to set Param Tx/Rx to CC or NRPN on MIDI: Page 7 (see *Parameter send/receive options (p. 108)*), whichever works best with your DAW. With these settings you can edit both parts at once on the Global channel, and still address them independently on their

own MIDI channels (if the Global channel isn't set to Omni).
But remember: Multi mode ignores note data on the Global channel. The notes must be sent directly to the Upper/Lower MIDI channels.

- If RX Lo + Up = Off, the Upper/Lower parts ignore note data, but will respond to parameter and controller data that arrives on the Global channel.

MIDI Bank select & Program changes

MIDI Bank select / Program change messages can access the Single mode patch banks, the Upper/Lower patch banks within Single mode, or switch to Multi mode and access the Multi patch banks. However, they can't select Upper/Lower patches inside a Multi.

This table shows which MIDI CC values to use to access a specific patch bank.

Mode	Patch Bank	MIDI CC (MSB)	MIDI CC (LSB)	Decimal	Hexadecimal
Single	A-H	00	00-07	1-8	00-07
Single	M1U-M5U	00	08-12	9-13	08-0C
Single	M1L-M5L	00	13-17	14-18	0D-12
Multi	M1-M5	00	18-22	19-23	13-17

Note: Each set of Bank select messages must be followed by a program change message in order to select the desired bank and patch. If all three components are not present the Hydrasynth Deluxe may not respond to them.

Remember:

- MIDI Bank select / Program change messages are always sent and received on the Global TX / RX channels.
- When MIDITxRx = Separate the Hydrasynth Deluxe responds to Bank / Program changes on the RXGlobal, RX Lo, and RX Up channels.

MIDI: Page 6

Control	Function	Settings	Description
1	Aftertouch transmit	Off, Mono, Poly	Send channel, polyphonic, or no aftertouch data to USB / MIDI
2	Ribbon pitch bend transmit	On, Off	On = ribbon sends pitch bend data Off = ribbon sends NRPN data
3	Sustain pedal transmit	On, Off	Send sustain pedal data via USB / MIDI
4	Expression pedal transmit	On, Off	Send expression pedal data via USB / MIDI
5	Mod wheel transmit (MIDI CC #1)	On, Off	Send mod wheel data via USB / MIDI
6	Mod wheel receive (MIDI CC #1)	On, Off	Receive mod wheel data via USB / MIDI
8 [1]	MPE	On, Off	Send / receive MPE data

[1] This will lock out, change or disable some system parameters (see note).

Aftertouch Transmit

Polyphonic aftertouch is an amazingly expressive tool. But it also generates a lot of control information, which can clog the MIDI data stream. Setting this to Off still allows both forms of aftertouch to be used locally but stops them from being transmitted. Mono enables Channel aftertouch values to be sent (one value for all active voices); Poly allows polyphonic aftertouch values to be sent.

What is MPE?

MPE stands for "MIDI Polyphonic Expression". It's a newer MIDI protocol used mainly by alternate controllers like Roli instruments, Haken Continuum, and LinnStrument. When active, the voices of your Hydrasynth break into individual channels so each note can have its own pitch bend, timbre and pressure control.

Hydrasynth already supports polyphonic aftertouch, so MPE pressure is mapped automatically to Poly aftertouch. When the Hydrasynth Deluxe has MPE set to ON, any patch that uses PolyAftT as a mod source should respond automatically to pressure sent by an MPE controller.

There are also several mod sources dedicated to MPE. For a list, see *Modulation Sources (p. 92)*.

Enabling MPE will lock out, change or disable certain system parameters:
- MIDI page 4: MIDI Tx & MIDI Rx = MPE Lock
- MIDI page 5: At TX = MPE Lock
- MIDI page 6: Overflow = MPE Lock (disabled).

MIDI: Page 7

Control	Function	Settings	Description
Knob 1	Param TX	Off, NRPN, CC [1]	Select data format sent by controls
Knob 2	Param RX	Off, NRPN, CC [1]	Select data format received by parameters
Button 3	Send Patch	(action)	Sends sys-ex of the current patch via MIDI
Button 4	Send All Patch..	(action)	Sends sys-ex of all patches and banks via MIDI
Knob 5	Overflow [2]	Off, On	Connect two Hydrasynth models for up to 32-voice functionality
Knob 6	Arp TX [2][3]	Off, On	Send Arp note on/off messages via MIDI / USB
Knob 7	Pgm Chg TX	Off, On	Send MIDI Program Change upon patch selection
Knob 8	Pgm Chg RX	Off, On	Receive MIDI Program Change commands

[1] The Param Tx/Rx settings do not affect the transmission or reception of System MIDI controls such as Mod wheel (CC #1), Volume (CC #7), or Sustain (CC #64). For a full list of System MIDI controls, see the *MIDI CC Charts (p. 122)*.

[2] The Arp TX setting has no effect when Overflow is set to On. Overflow must be set to Off to transmit the arpeggiator notes.

[3] This also toggles the arpeggiator response to incoming MIDI/USB notes.

Parameter send/receive options

These parameters determine whether the Hydrasynth will transmit (TX) or receive (RX) 7-bit MIDI CC's or NRPNs during parameter changes. This allows for more user-friendly automation on DAWs that do not support the MIDI NRPN standard. For independent control of the Upper/Lower parts, see *MIDI: Page 5 (p. 106)*.

Note: Standard MIDI controls such as Mod wheel (CC #1), Volume (CC #7), and Sustain (CC #64) are not affected by the Param Tx/Rx settings. Some of those can be configured independently; see *MIDI: Page 6 (p. 107)*.

The CC numbers for each control are listed in the *MIDI CC Charts (p. 122)*.

What's a NRPN?

NRPN stands for Non-Registered Parameter Number. It's a way of allowing higher-resolution control data to be sent and received. Implementation is not standardized, so each manufacturer uses different methods. The NRPN implementation data for Hydrasynth is available at *AshunSoundMachines.com*.

Send Patch / All Patches

These actions transmit sys-ex data via 5-pin MIDI or via USB to your computer. You can send one patch to any Hydrasynth or all patches to another Hydrasynth Deluxe.

But if you want to organize your patches and share them between units, the best way is to use our free Hydrasynth Manager application: *https://www.ashunsoundmachines.com/downloads*. It makes it easy to store your patches to a computer and share them between Hydrasynths over USB.

Overflow

Two Hydrasynth models can act like one unit using Overflow mode. To use this feature, start with the Hydrasynth Deluxe in Single mode.

It's simple: Connect a MIDI cable from the MIDI Out of the Hydrasynth Deluxe (the "master") to the MIDI In of the other unit (the "slave"). Next, enable Overflow on the master. Connect the main audio outputs of both units to your sound system, and set good levels for each.

Now play 17 notes on the Hydrasynth Deluxe: it plays the first 16 voices and the 17th comes from the slave. After that the slave will continue to cycle through voices 17-24.

Here are some other things to know about Overflow mode:

- If the units have identical patch banks, enable PgmChgTX on the master and PgmChgRX on the slave. When you select a patch on the master, the slave will select the same patch.
- Set the master ParamTX and slave ParamRX to NRPN. Then almost every edit made on the master will also be made on the slave.
- When both units have Mono or Unison patches selected, their voices are stacked as a single instrument (i.e., no overflow).
- If the slave doesn't have a certain Single mode patch, you can send it from the master to the slave via sys-ex (see the previous section). Warning: This overwrites the current patch location on the slave, so be sure to select an available location on the slave first.
- Overflow only works over the 5-pin MIDI connection, not USB MIDI.

Arp TX

Set this to On if you want the arpeggiator to transmit note on/off commands over MIDI / USB. It also toggles the arpeggiator response to incoming notes. See *The Arpeggiator & MIDI (p. 85)* for more info. If the Clock = INT on System setup *MIDI: Page 4 (p. 105)*, sync signals are sent whether Arp TX is On or Off.

Pgm Chg TX / RX

These parameters determine whether the Hydrasynth Deluxe will transmit (TX) or receive (RX) MIDI program change commands. Program change and Bank select messages are always sent and received on the TX/RX Global channels. See *MIDI: Page 5 (p. 106)* for more information.

CV – Pitch Gate: Page 8

These settings are compatible with most modular synthesizer equipment. Please refer to the specifications of other devices and match those settings on the Hydrasynth Deluxe.

Control knob	Function	Range
1	Control Voltage Range [1]	Octave (0-10V, -/+5V); Hz 0-10V; Octave 1.2V
2	Reference note [2]	C-1 to G9
3	Control Voltage Offset	-99 cents to +99 cents
4	Control Voltage Source	Keyboard, Theremin
5	Gate Type	V-trig, S-trig
6	Gate Volt	3V, 5V, 10V

[1] Octave = Volt per octave, Hz = Hz/Volt

[2] 1V reference note for Hz/V, or lowest V reference note for V/Oct.

CV Source: Keyboard, Theremin

This setting allows you to specify whether the keyboard or the ribbon will be the CV/Gate source. For best results, set the ribbon to *Theremin Mode (p. 80)* and enable the Quantize parameter so its output will conform to the selected Scale.

CV – Clock: Page 9

These are the settings required to synchronize with most non-MIDI devices. Please refer to the specifications of other devices and match those settings on the Hydrasynth Deluxe.

Control knob	Function	Range
1	Clock Control Voltage	3V, 5V, 10V
2	Clock Rate	1 PPS, 2 PPQ, 24 PPQ, 48 PPQ
3	Clock Division	Off, 1/2, 2, 4
4	Clock Offset	-100ms to +100ms

PPS (Pulse Per Step) sends a single cycle of the clock output with every Arpeggiator step, or every time [TAP TEMPO] is pressed when the Tap Trig parameter is active on Arp Edit page 2. PPS works well with modular synths: the clock output behaves a bit like a Gate output (with Tap Trig) or even as a square wave LFO.

PPQ stands for Pulse Per Quarter note. Between these three options and the Clock Division value it is possible to generate a wide variety of clock signals from 1/2 PPQ to 96 PPQ.

Clock Division

This subdivides or multiplies the clock output: 1/2 divides by 0.5, so the clock speeds up (to double tempo); 2 and 4 slow down the clock to half tempo and one-quarter tempo, respectively. A setting of Off = no change.

CV – Mods: Page 10

These settings enable the use of devices with different CV standards. For example, Input / Output Mod 1 can be set to +/- 5V while Input / Output Mod 2 are set to 0-10V. The Offset ranges are independent in each direction, which allows the voltages to be fine-tuned to compensate for the idiosyncrasies of individual devices.

Control knob	Function	Range
1	IM1 Range (Mod 1 input)	+/- 5V, 0-10V, 0-5V, 0-1V
2	IM2 Range (Mod 2 input)	+/- 5V, 0-10V, 0-5V, 0-1V
3	OM1 Range (Mod 1 output)	+/- 5V, 0-10V, 0-5V, 0-1V
4	OM2 Range (Mod 2 output)	+/- 5V, 0-10V, 0-5V, 0-1V
5	IM1 Offset (Mod 1 input)	+/- 3.0V
6	IM2 Offset (Mod 2 input)	+/- 3.0V
7	OM1 Offset (Mod 1 output)	+/- 3.0V
8	OM2 Offset (Mod 2 output)	+/- 3.0V

The allowable range for input /output voltages is from -5V to 10V. If an input or output value attempts to exceed the range, it will be clipped automatically to the lowest or highest possible value depending on which value has been exceeded.

Calibration: Page 11

Control button	Function	Range	Description
2	Calibrate Ribbon	(access)	(see below)
3	Calibrate Wheels	(access)	Full-range motion of each wheel

Calibrate Ribbon

Use Control button 2 to access the calibration page and follow the instructions on Left display. Press and hold the ribbon above the first five C keys on the keyboard (the ones below the ribbon). After each point has been calibrated the page will exit automatically.

Calibrate Wheels

Use Control button 3 to access the calibration page and follow the instructions on Left display. Move each wheel slowly through its entire range, then press [EXIT]. It's okay if the numbers do not reach 0 and 128 during calibration; the full range of MIDI values is available within the calibrated range.

System: Page 12

Control button	Function	Description	Range
1	Self Test	(action)	Hold the button and all LEDs and displays are lit at maximum for visual inspection.
2	Factory Reset	(action)	Resets all parameters in System Setup to their default values. This does not erase the patch banks.

OS: Page 13

There are only two items on this page: the OS version and the embedded serial number. Please include these in any communications you might have with our Technical Support department.

And always install the latest firmware in your Hydrasynth Deluxe so you can take advantage of new features as they are added!

[INIT] + Button X

The following modules can be initialized by holding [INIT] and pressing the Access button.

- Amp
- Arp On
- Delay
- Env (1-5)
- Filter (1, 2)
- LFO (1-5)
- Macro Assign
- Mixer
- Mod Matrix
- Mutant (1-4)
- Osc (1, 2, 3)
- Post-FX
- Pre-FX
- Reverb
- Ribbon
- Ring-Noise
- Voice

Hold [INIT] and press [Multi], [Lower], or [Upper] to initialize those items. Note that [INIT] + [Multi] affects only the Multi parameters (MultMode, Balance, Octave settings, etc.), not the Upper/Lower parts.

[INIT] + Control Button X

The following parameters can be initialized by holding [INIT] and pressing the appropriate Control button.

Location	Parameter
Arp	Time Div, Swing, Gate, OctMode, Range, Mode, Length, Ratchet, Chance
Voice	Density, Detune, AnalogFL, StWidth, PitchBnd, Vib Amt, Vib Rate, GlidTime, GlidCurv, VoiceMod Edit
Voice / Scale Edit	Note 2-8
Voice / VoiceMod Edit	Voice 1-8, Voice 9-16
Macro / Assign Edit	Depth (or turn Control knob to initialize Depth value)
Mod Matrix	Depth (or turn Control knob to initialize Depth value)
Osc	Wave, Semi, Cents, WaveScan, Wavelist Edit, Density, Detune, Keytrack
Wavelist Edit	Wave 1-8
Mutant	Smooth, Ratio, Depth, Window, Feedback, Dry/Wet
Mutator / Custom Edit	Warp 1-8
Ring Noise	RMDepth, RingVol, NoiseType, NoiseVol
Mixer	Osc1Pan, Osc2Pan, RingPan, NoisePan, Osc1Filt, Osc2Filt, RingFilt, NoisFilt

Location	Parameter
Filter	Type, Morph, Cutoff, Resonance, Drive, Control, Env1Amt, LFO1Amt, Keytrack
Amp	LFO2Amt, AmpLevel
Pre-FX	[Param1-5], Dry/Wet
Delay	Time, Feedback, HiDamp, LoDamp, PreDelay, Dry/Wet
Reverb	Size, Time, Tone, HiDamp, LoDamp, PreDelay, Dry/Wet
Post-FX	[Param1-5], Dry/Wet
Env	Attack, Decay, Sustain, Release, Delay, Hold, AtkCurve, DecCurve, SusCurve, RelCurve, Repeat
LFO	Wave, Rate, TrigSync, Delay, Fade In, Phase, Level, Steps, Smooth, Step Edit
LFO / Step Edit	Step 1-8
Multi Edit	MultMode, VelSplit, Lo Max, Up Min, Balance, Lo / Up Fade, KeySplit, CrssFade, Lo / Up Oct, ARP, SusPedal, PitchBnd, ModWhl

[RANDOM] + Button X

The following modules can be randomized by holding [RANDOM] and pressing the Access button.

Button	Button	Button	Button
Amp	LFO (1-5)	Osc (1, 2, 3)	Ring-Noise
Arp On	Macro Assign	Post-FX	Voice
Delay	Mixer	Pre-FX	< or > (select random patch)
Env (1-5)	Mod Matrix	Reverb	-
Filter (1, 2)	Mutant (1-4)	Ribbon	-

Hold [RANDOM] and press [Multi], [Lower], or [Upper] to initialize those items. Note that [RANDOM] + [Multi] affects only the Multi parameters (MultMode, Balance, Octave settings, etc.), not the Upper/Lower parts. Press [RANDOM] twice from the Multi Home page to generate an entirely randomized Multi.

[SHIFT] + Button X

These shortcuts are available by holding [SHIFT] and pressing the button.

Button	Function
Octave Down	Jump to lowest octave (-4)
Octave Up	Jump to highest octave (+4)
Arp On	Access Arp Edit page
Arp Latch	Sustain Hold toggle
Browse	Access Browse Favorites page
<	Decrease patch number by -10
>	Increase patch number by +10
Home	Send All Notes Off command to engine, USB, and MIDI Turn off all voices and end all Envelopes Set all Gates to Off
Page Up	Jump to top page
Page Down	Jump to bottom page
Random (2x)	Press [RANDOM] twice. After the second press a random selection of values is pulled from other patches.
Multi Edit	Access Multi Edit page

[SHIFT] + Control Knob X

The following value jumps are available by holding [SHIFT] and turning the appropriate Control knob.

Location	Control knob	Behavior
Arp	Tempo	Fine-tune by 0.1
Arp	Length	Jump to the closest special value [1, 2, 4, 8, 16, 32]
Browse	Patch	Jump by 10
Browse	Compare	Jump by 10
Patch	Save Patch #	Jump by 10
Voice	Pitchbend	Jump to the closest special value [0, 2, 4, 5, 7, 12, 24]
Macro Assign	Edit Destination Module	Jump to the closest first group of each type
Mod Matrix	Source	Jump to the closest first modulator of each group
Mod Matrix	Destination Module	Jump to the closest first group of each type
Osc X	Wave	Jump to the closest first wave of each group
Osc X	Semi	Jump to the closest special value [-36, -24, -12, 0, 12, 24, 36]
Osc X	Wavescan	Jump to the point of Wave position shown in inverted color [1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0]
Mutant X	Ratio	Jump to the closest special value [0.25, 0.5, 1, 2, 3, 4, 5, 6, 7... 64]
Multi Edit	KeySplit	Jump to the same key in the next octave, within the range C2-C7 (i.e., from D#3 to D#4, etc.)

[SHIFT] + Control Button X

Location	Control Button	Behavior
Home	Macro	Depends on settings on System Setup page 2. See *Macro Button Response (p. 88)*.
Reverb	Time	Toggle activation of Time Freeze
Envelope	Delay, Attack, Hold, Decay, or Release	Duration of holding the button determines the time value.
LFO	Rate, Delay, Fade In	Duration of holding the button determines the time value.

Preset Standard Scales

Below are the notes of each preset scale relative to the key of C. An "x" means that note is in the scale; a dash means it is not.

Scale	C	C♯/D♭	D	D♯/E♭	E	F	F♯/G♭	G	G♯/A♭	A	A♯/B♭	B
Chromatic	x	x	x	x	x	x	x	x	x	x	x	x
Major	x	-	x	-	x	x	-	x	-	x	-	x
BeBop Maj	x	-	x	-	x	x	-	x	x	x	-	x
BeBop	x	-	x	-	x	x	-	x	-	x	x	x
Mixolydian	x	-	x	-	x	x	-	x	-	x	x	-
Harmonic Major	x	-	x	-	x	x	-	x	x	-	-	x
Lydian	x	-	x	-	x	-	x	x	-	x	-	x
Lydian Aug	x	-	x	-	x	-	x	-	x	x	-	x
Acoustic	x	-	x	-	x	-	x	x	-	x	x	-
Pentatonic Maj	x	-	x	-	x	-	-	x	-	x	-	-
Locrian Maj	x	-	x	-	x	x	x	-	x	-	x	-
Prometheus	x	-	x	-	x	-	x	-	-	x	x	-
Whole Tone	x	-	x	-	x	-	x	-	x	-	x	-
Melodic Minor [1]	x	-	x	x	-	x	-	x	x	x	x	x
Half Diminished	x	-	x	x	-	x	x	-	x	-	x	-
Aeolian	x	-	x	x	-	x	-	x	x	-	x	-
Dorian	x	-	x	x	-	x	-	x	-	x	x	-
Harmonic Minor	x	-	x	x	-	x	-	x	x	-	-	x
Algerian	x	-	x	x	-	x	x	x	x	-	-	x
Gypsy	x	-	x	x	-	-	x	x	x	-	x	-
Hungarian	x	-	x	x	-	-	x	x	x	-	-	x
Ukranian	x	-	x	x	-	-	x	x	-	x	x	-
Dim. Whole Tone	x	x	-	x	x	-	x	-	x	-	x	-
Locrian	x	x	-	x	-	x	x	-	x	-	x	-
Neapolitan Major	x	x	-	x	-	x	-	x	-	x	-	x

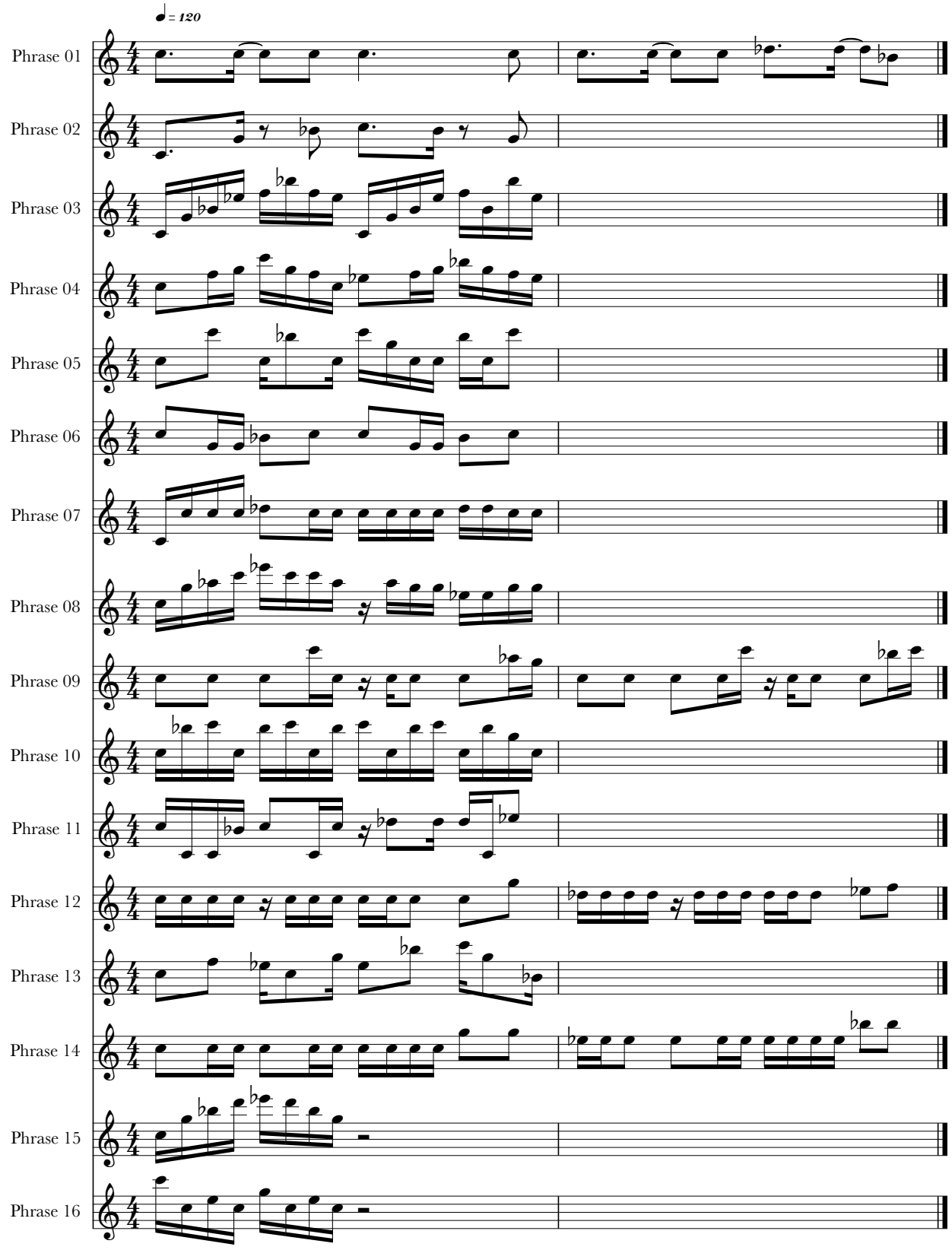
[1] For the Melodic Minor scale both the ascending and descending scales are included.

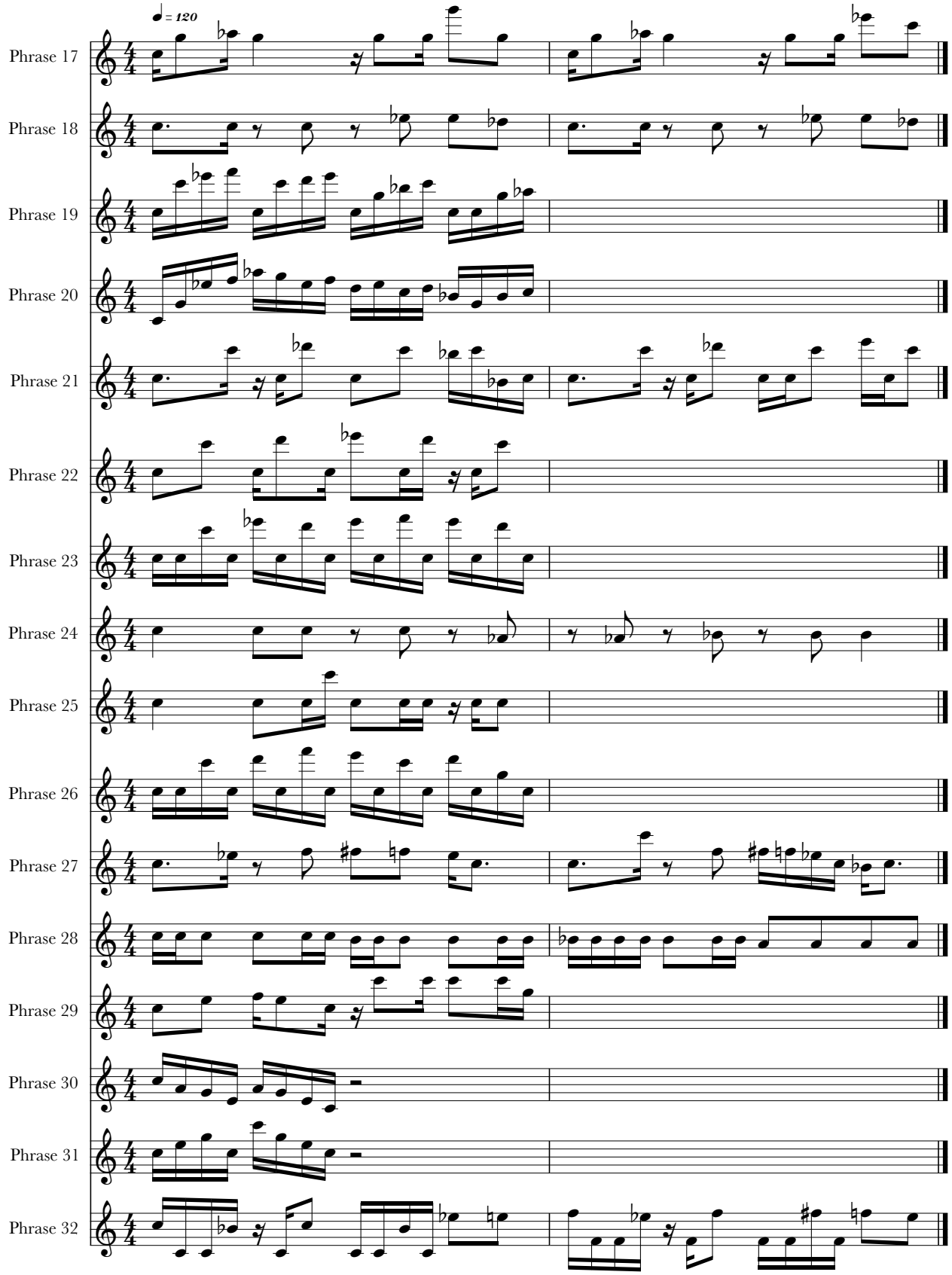
Scale	C	C♯/D♭	D	D♯/E♭	E	F	F♯/G♭	G	G♯/A♭	A	A♯/B♭	B
Neapolitan Minor	x	x	-	x	-	x	-	x	x	-	-	x
Phrygian	x	x	-	x	-	x	-	x	x	-	x	-
Flamenco	x	x	-	-	x	x	-	x	x	-	-	x
Persian	x	x	-	-	x	x	x	-	x	-	-	x
Phrygian Dominant	x	x	-	-	x	x	-	x	x	-	x	-
Enigmatic	x	x	-	-	x	-	x	-	x	-	x	x
Tritone	x	x	-	-	x	-	x	x	-	-	x	-
In	x	x	-	-	-	x	-	x	x	-	-	-
Insen	x	x	-	-	-	x	-	x	-	-	x	-
Augmented	x	-	-	x	x	-	-	x	x	-	-	x
Blues	x	-	-	x	-	x	x	x	-	-	x	-
Pentatonic Minor	x	-	-	x	-	x	-	x	-	-	x	-
Hirajoshi	x	-	-	-	x	-	x	x	-	-	-	x

Preset Microtuning Scales

Micro scale #	Name	Scale	Name
1	1/4 Tone	17	Diaphonic 12-tone
2	19 Tone	18	Eikosany 1 3-11
3	31 Tone	19	Greek Aeolic
4	Al-Farabi SynChrom	20	H. Partch 43-note
5	Arabic 12-tone	21	Harmonic A 1-60
6	Archytas Chromatic	22	Hexany 1 3 5 9
7	Archytas Enharmonic	23	Hexany 1 3 7 11
8	Belafon Singapore	24	Hexany 13 11 13
9	Belafon W. Africa	25	Indian Raga
10	Bendeler Well-Tempered	26	Japanese Koto
11	Bohlen 11-tone	27	Just Major C
12	Chinese 300 B.C.	28	Just Minor C
13	Chinese DiziFlute	29	Mean tone C
14	Crysanthos Byzantine	30	Pelog / Slendro
15	Dekany 1 3 5 11-3	31	Sk8board 17-65 Tun
16	Dekany 1 3 5 7 11	32	W. Carlos Harmonic

Hydrasynth Phrases 1-16

Ashun Sound Machines

Hydrasynth Phrases 17-32

Ashun Sound Machines

Hydrasynth Phrases 33-48

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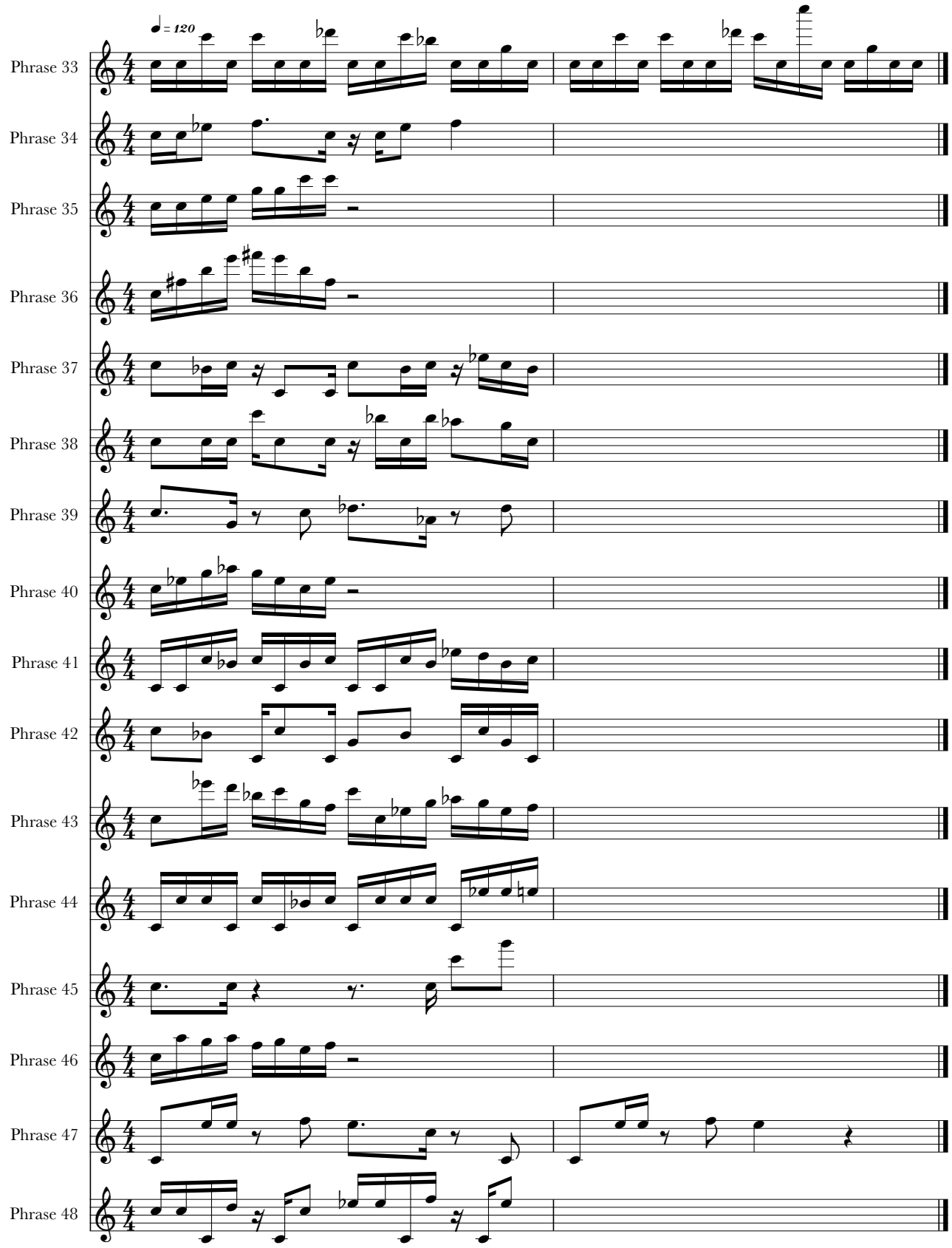
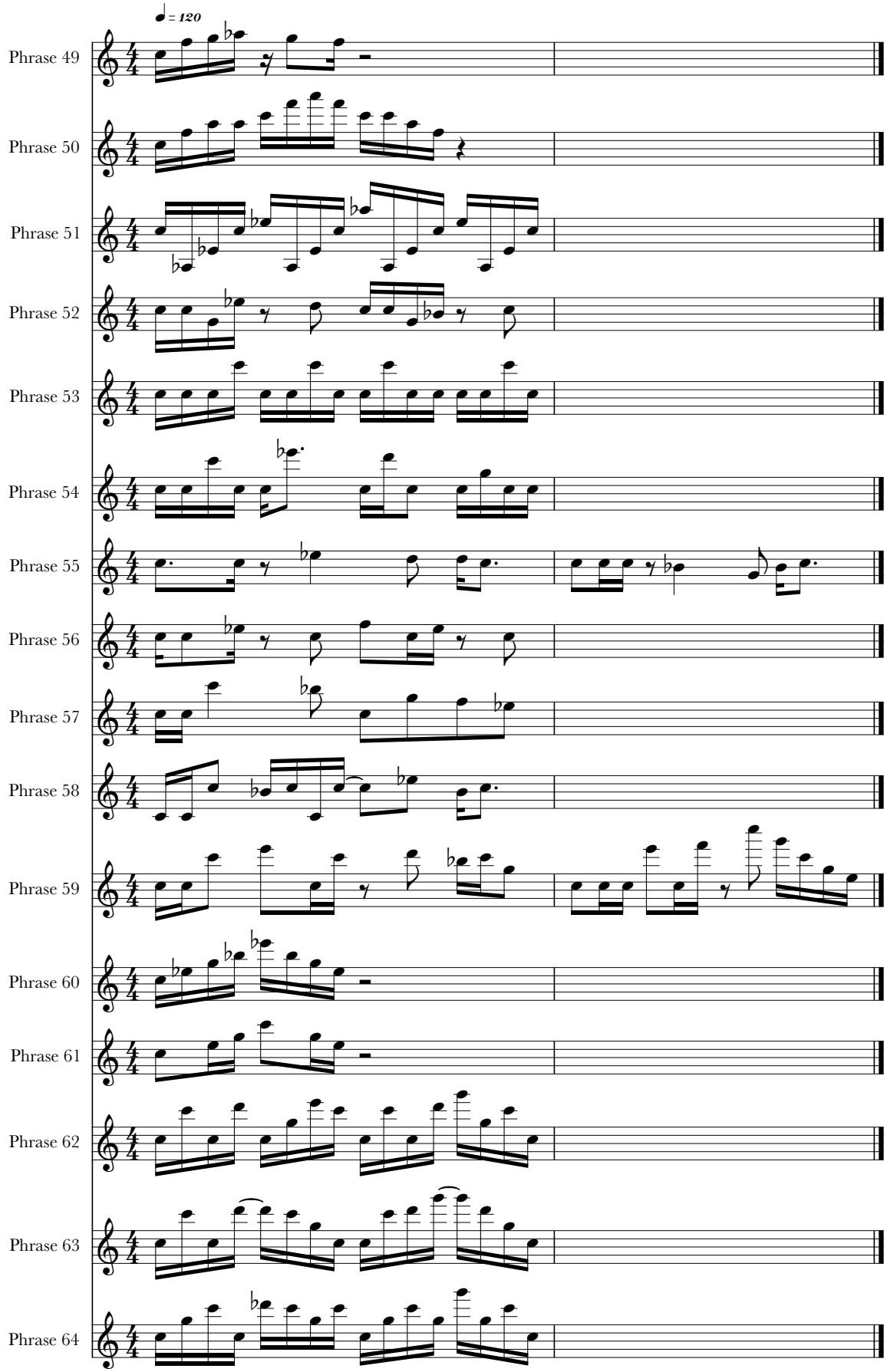

Hydrasynth Phrases 49-64

Ashun Sound Machines

Sorted by Module

Module	Parameter	CC
Amp	Amp LFO2amt	62
ARP	ARP Division	106
ARP	ARP Gate	107
ARP	ARP Mode	108
ARP	ARP Ratchet	109
ARP	ARP Chance	110
ARP	ARP Octave	120
ARP	ARP Length	122
Delay	Delay Feedback	14
Delay	Delay Time	15
Delay	Delay Wet tone	63
Delay	Delay Dry/Wet	92
ENV 1	ENV1 Attack	81
ENV 1	ENV1 Decay	82
ENV 1	ENV1 Sustain	83
ENV 1	ENV1 Release	84
ENV 2	ENV2 Attack	85
ENV 2	ENV2 Decay	86
ENV 2	ENV2 Sustain	87
ENV 2	ENV2 Release	88
ENV 3	ENV3 Attack	89
ENV 3	ENV3 Decay	90
ENV 3	ENV3 Sustain	96
ENV 3	ENV3 Release	97
ENV 4	ENV4 Attack	25
ENV 4	ENV4 Decay	27
ENV 4	ENV4 Release	124
ENV 4	ENV4 Sustain	125
ENV 5	ENV5 Attack	102
ENV 5	ENV5 Decay	103
ENV 5	ENV5 Sustain	104
ENV 5	ENV5 Release	105
Filter 1	Filter 1 Drive	50
Filter 1	Filter 1 Keytrack	51
Filter 1	Filter 1 LFO1amt	52
Filter 1	Filter 1 Vel Env	53
Filter 1	Filter 1 ENV1amt	54
Filter 1	Filter 1 Res	71
Filter 1	Filter 1 Cutoff	74
Filter 2	Filter 2 Cutoff	55
Filter 2	Filter 2 Res	56
Filter 2	Filter 2 Type	57
Filter 2	Filter 2 Keytrack	58
Filter 2	Filter 2 LFO1amt	59
Filter 2	Filter 2 Vel Env	60
Filter 2	Filter 2 ENV1amt	61
LFO 1	LFO1 Gain	70
LFO 1	LFO1 Rate	72
LFO 2	LFO2 Gain	28
LFO 2	LFO2 Rate	73
LFO 3	LFO3 Gain	75
LFO 3	LFO3 Rate	76
LFO 4	LFO4 Gain	77
LFO 4	LFO4 Rate	78
LFO 5	LFO5 Gain	79
LFO 5	LFO5 Rate	80
Macros	Macro 1	16
Macros	Macro 2	17
Macros	Macro 3	18
Macros	Macro 4	19
Macros	Macro 5	20
Macros	Macro 6	21
Macros	Macro 7	22
Macros	Macro 8	23
Mixer	Noise Vol	03
Mixer	Noise Pan	08
Mixer	Ring Mod Vol	09
Mixer	Ring Mod Pan	10
Mixer	RM12 Depth	43
Mixer	OSC1 Vol	44
Mixer	OSC1 Pan	45
Mixer	OSC2 Vol	46
Mixer	OSC2 Pan	47
Mixer	OSC3 Vol	48
Mixer	OSC3 Pan	49

Mixer	OSC 3 FRate	114
Mixer	Noise FRate	115
Mixer	Ring Mod FRate	116
Mixer	OSC1 FRate	118
Mixer	OSC2 FRate	119
Mutator 1	Mutator1 Ratio	29
Mutator 1	Mutator1 Depth	30
Mutator 1	Mutator1 Dry/Wet	31
Mutator 2	Mutator2 Ratio	33
Mutator 2	Mutator2 Depth	34
Mutator 2	Mutator2 Dry/Wet	35
Mutator 3	Mutator3 Ratio	36
Mutator 3	Mutator3 Depth	37
Mutator 3	Mutator3 Dry/Wet	39
Mutator 4	Mutator4 Ratio	40
Mutator 4	Mutator4 Depth	41
Mutator 4	Mutator4 Dry/Wet	42
OSC 1	OSC1 wavscan	24
OSC 1	OSC 1 Cent	111
OSC 2	OSC2 WavScan	26
OSC 2	OSC 2 Cent	112
OSC 3	OSC 3 Cent	113
Post-fx	POST-FX Param1	68
Post-fx	POST-FX Param2	69
Post-fx	POST FX Mix	94
Pre-fx	PRE-FX Param1	12
Pre-fx	PRE-FX Param2	13
Pre-fx	PRE-FX Mix	93
Reverb	Reverb Time	65
Reverb	Reverb Tone	67
Reverb	Reverb Dry/Wet	91
System	Bank select MSB	00
System	Modulation wheel.	01
System	Master Volume	07
System	Expression pedal	11
System	Bank select LSB	32
System	Sustain pedal	64
System	All notes off	123

Voice	GlidTime	05
Voice	Glide	66
Voice	Detune	95
Voice	StWidth	117

Sorted by CC Number

Module	Parameter	CC
System	Bank select MSB	00
System	Modulation wheel.	01
Mixer	Noise Vol	03
Voice	GlidTime	05
System	Master Volume	07
Mixer	Noise Pan	08
Mixer	Ring Mod Vol	09
Mixer	Ring Mod Pan	10
System	Expression pedal	11
Pre-fx	PRE-FX Param1	12
Pre-fx	PRE-FX Param2	13
Delay	Delay Feedback	14
Delay	Delay Time	15
Macros	Macro 1	16
Macros	Macro 2	17
Macros	Macro 3	18
Macros	Macro 4	19
Macros	Macro 5	20
Macros	Macro 6	21
Macros	Macro 7	22
Macros	Macro 8	23
OSC 1	OSC1 wavscan	24
ENV 4	ENV4 Attack	25
OSC 2	OSC2 WavScan	26
ENV 4	ENV4 Decay	27
LFO 2	LFO2 Gain	28
Mutator 1	Mutator1 Ratio	29
Mutator 1	Mutator1 Depth	30
Mutator 1	Mutator1 Dry/Wet	31
System	Bank select LSB	32
Mutator 2	Mutator2 Ratio	33
Mutator 2	Mutator2 Depth	34
Mutator 2	Mutator2 Dry/Wet	35
Mutator 3	Mutator3 Ratio	36
Mutator 3	Mutator3 Depth	37
Mutator 3	Mutator3 Dry/Wet	39
Mutator 4	Mutator4 Ratio	40
Mutator 4	Mutator4 Depth	41
Mutator 4	Mutator4 Dry/Wet	42
Mixer	RM12 Depth	43
Mixer	OSC1 Vol	44
Mixer	OSC1 Pan	45
Mixer	OSC2 Vol	46
Mixer	OSC2 Pan	47
Mixer	OSC3 Vol	48
Mixer	OSC3 Pan	49
Filter 1	Filter1 Drive	50
Filter 1	Filter1 Keytrack	51
Filter 1	Filter1 LFO1amt	52
Filter 1	Filter1 Vel Env	53
Filter 1	Filter1 ENV1amt	54
Filter 2	Flt2 Cutoff	55
Filter 2	Flt2 Res	56
Filter 2	Flt2 Type	57
Filter 2	Filter2 Keytrack	58
Filter 2	Filter2 LFO1amt	59
Filter 2	Filter2 Vel Env	60
Filter 2	Filter2 ENV1amt	61
Amp	Amp LFO2amt	62
Delay	Delay Wet tone	63
System	Sustain pedal	64
Reverb	Reverb Time	65
Voice	Glide	66
Reverb	Reverb Tone	67
Post-fx	POST-FX Param1	68
Post-fx	POST-FX Param2	69
LFO 1	LFO1 Gain	70
Filter 1	Filter1 Res	71
LFO 1	LFO1 Rate	72
LFO 2	LFO2 Rate	73
Filter 1	Filter1 Cutoff	74
LFO 3	LFO3 Gain	75
LFO 3	LFO3 Rate	76
LFO 4	LFO4 Gain	77
LFO 4	LFO4 Rate	78
LFO 5	LFO5 Gain	79
LFO 5	LFO5 Rate	80
ENV 1	ENV1 Attack	81
ENV 1	ENV1 Decay	82

ENV 1	ENV1 Sustain	83
ENV 1	ENV1 Release	84
ENV 2	ENV2 Attack	85
ENV 2	ENV2 Decay	86
ENV 2	ENV2 Sustain	87
ENV 2	ENV2 Release	88
ENV 3	ENV3 Attack	89
ENV 3	ENV3 Decay	90
Reverb	Reverb Dry/Wet	91
Delay	Delay Dry/Wet	92
Pre-fx	PRE-FX Mix	93
Post-fx	POST FX Mix	94
Voice	Detune	95
ENV 3	ENV3 Sustain	96
ENV 3	ENV3 Release	97
ENV 5	ENV5 Attack	102
ENV 5	ENV5 Decay	103
ENV 5	ENV5 Sustain	104
ENV 5	ENV5 Release	105
ARP	ARP Division	106
ARP	ARP Gate	107
ARP	ARP Mode	108
ARP	ARP Ratchet	109
ARP	ARP Chance	110
OSC 1	OSC1 Cent	111
OSC 2	OSC2 Cent	112
OSC 3	OSC3 Cent	113
Mixer	OSC3 FRate	114
Mixer	Noise FRate	115
Mixer	RM12 FRate	116
Voice	StWidth	117
Mixer	OSC1 FRate	118
Mixer	OSC2 FRate	119
ARP	ARP Octave	120
ARP	ARP Length	122
System	All notes off	123
ENV 4	ENV4 Release	124
ENV 4	ENV4 Sustain	125

Physical

Dimensions – Without shelf: 113.1 x 34.9 x 11.8 cm (44.53 x 13.74 x 4.65 inches)

Dimensions – Shelf installed: 113.1 x 42.3 x 11.8 cm (44.53 x 16.65 x 4.65 inches)

Weight: 13.3 kg (29.33 lbs)

Connections: Rear Panel

- MIDI In/Out/Thru
- USB type B port, class-compliant
- Stereo outputs: two pairs (1/4", balanced)
- Sustain pedal input (polarity-sensing)
- Expression pedal input (reversible)
- Power: 12 V DC, ≥2A (Center: positive)

Connections: Top Panel

CV inputs: Two (1/8" TS)

- Mod 1
- Mod 2

CV/Gate/Clock outputs: Five (1/8" TS)

- Pitch
- Gate
- Mod 1
- Mod 2
- Clock

Control Voltages

- Range: -5V to 10V
  - Pitch: + / - 99 cents
  - Mod: + / - 3.0V
- Standards: 1V / octave, 1.2V / octave, Hz/Volt

Clock Output

- Range: 3V, 5V, 10V
- Rates: 1 PPS, 2PPQ, 24 PPQ, 48PPQ
  - Offset: + / - 100ms
  - Division: 1/2x, 2x, 4x

Gate Output

- Range: 3V, 5V, 10V
- Type: V-trig, S-trig

Connections: Front Panel

- Two headphone connectors
  - 6.35 mm (1⁄4 in)
  - 3.5 mm
- Impedance: 16 – 75 Ohm
- Shared volume control

USA

Important Notice:
DO NOT MODIFY THE UNIT!

This product, when installed as indicate in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Ashun Sound Machines could void your FCC authorization to use this product in the USA.

IMPORTANT: When connecting this product to accessories and/or another product, use only high-quality shielded cables. The cable(s) supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.

NOTE: This product has been tested and found to comply with the limit for a Class B Digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide a reasonable protection against harmful interference in a residential environment. This equipment generates, uses, and may radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause interferences harmful to the operation to other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference, which can be determined by turning the equipment off and on, please try to correct the interference by one or more of the following measures:

- Relocate either this product or the device that is affected by the interference.
- Use power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter(s).
- In the case of radio or TV interference, relocate and/or reorient the antenna. If the antenna lead-in is a 300 ohm ribbon lead, change the lead-in to the coaxial cable.
- If these corrective measures do not achieve satisfactory results, please consult the dealer or an experienced radio/TV technician for help.

The above statements apply ONLY to those products distributed in the USA.

CANADA

NOTICE: This class B digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulation.

AVIS: Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

EUROPE

CE

This product complies with the requirements of European Directive 89/336/EEC

This product may not work correctly as a result of electro-static discharge. If that happens, simply restart the product.