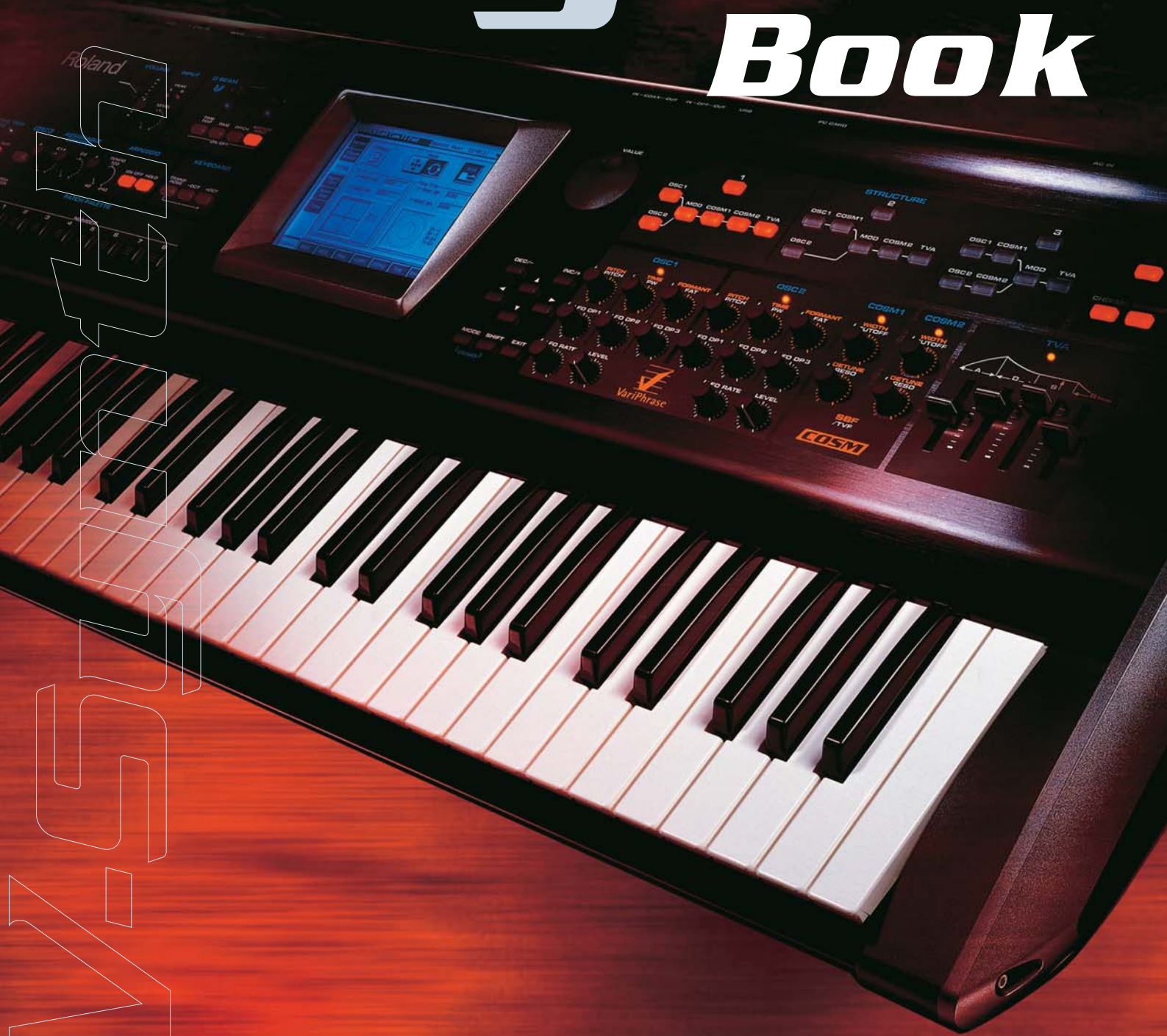


Roland®

# *The* **Beyond Reality** *V-Synth* *Book*



V-Synth

# Next-Generation Synthesis for Unlimited

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# Doorway to a new universe of musical expression

## the V-Synth!

**Unlimited sonic creation.** Only synthesizers have such power. Unlike traditional instruments such as the familiar piano or violin, the synthesizer does not have a sound of its own. However, the **synthesizer** is unique in that it can generate sounds no one has ever heard before.

Sound can be created in a vast number of ways. **Analog synthesizers** start from an electronically-created square wave or sawtooth wave, and boost or cut specific overtones. **PCM synthesizers** use large libraries of sampled waveforms to simulate acoustic instruments. Synthesizers have evolved through steady technical advances as well as startling technological breakthroughs.

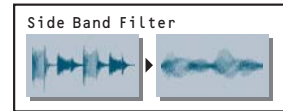
Today, approximately a half-century from the birth of the synthesizer, Roland continues to envision the shape of synthesizers to come. What kind of synthesizer might allow the continued use of existing knowledge and techniques, and yet break through all previous boundaries to create new and compelling sounds?

*Roland's efforts have borne fruit in a synthesizer that takes carries both types of synthesis to the ultimate height — the V-Synth!*

Cutting-edge Roland technologies such as **VariPhrase** and **COSM** focus on the main theme — **synthesize!** By controlling “time” — one of the core elements of sound — the V-Synth delivers new sound-making potential. You can synthesize new sounds using the factory preset waves, and even use original waves that you’ve sampled yourself.

For the first time ever, here is a synthesizer providing a **Sideband Filter** that can add inharmonic overtones. Previous synthesizers were able to produce only harmonic overtones, yet many of the sounds in the world around us include inharmonic overtones that add timbral richness.

The **Sideband Filter** lets you produce a completely new breed of sounds rich with natural expressiveness as never before.



Interfaces such as the **TimeTrip Pad** and the **D Beam Controller** let you spontaneously animate these synthesized sounds in realtime.



The V-synth also supports **V-LINK**, letting you control visual images in much the same way as you perform music. There is an infinite number of ways to expressively link sound and images. For instance, you can change the playback speed of image clips using **Pitch bend** or **TimeTrip**, or use the **D Beam** to vary the brightness or hue of an image.



The **V-Synth** is a new generation of synthesizer that frees sound- and sight-lovers from earlier creative restrictions. Go ahead — open the door that awaits you! Welcome to an uncharted universe of expression!



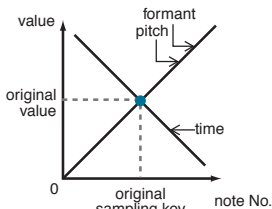
# Main Features

## Amazing VariPhrase synthesis — Oscillator —

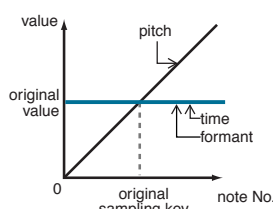
You can choose from three completely different types of **oscillators** that lie at the heart of the V-Synth: analog modeling, PCM, and external input oscillators. It is exciting to realize that the PCM oscillator features Roland's proprietary cutting-edge **VariPhrase** technology.

## Independent adjustment of Pitch, Time and Formant is the essence of the V-Synth!

The elements that determine the character of a sound include Pitch, Playback Time, and Timbre (or "Formants"). Until now, none of these elements could be controlled without affecting the others. However, Roland's **VariPhrase** technology lets you control each characteristic independently. The V-Synth pays special attention to the way that a sound changes when you manipulate its playback **time**. You can vary the speed of a phrase loop without affecting its pitch or timbre (formants), or create harmonies from a single phrase sample. You can even take a decay-type sound such as a piano and slow it down to a sustained state similar to bowed strings. These are all methods of synthesis that could not be imagined before. Time parameters themselves can be controlled using LFO, velocity, or envelopes! These sound-shaping methods are possible only on the V-Synth!



\* On a conventional sampler, pitch, time, and formant always change together.



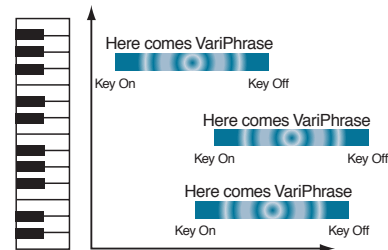
\* When you use VariPhrase, time and formant will remain fixed, and only the pitch will vary.

## Play waves any way you like! (Playback Mode)

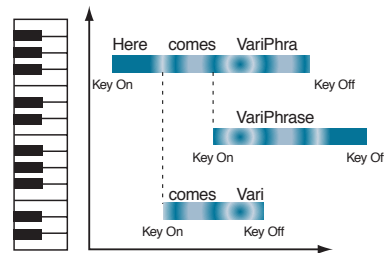
There are four VariPhrase playback modes.



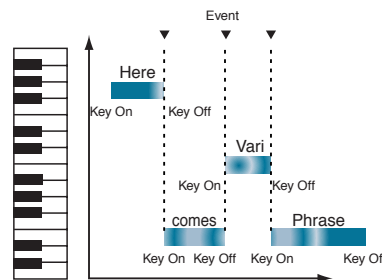
**RETRIGGER:** The phrase plays from the beginning each time you press a key. This is the most typical mode.



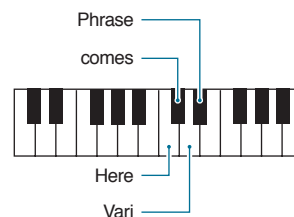
**LEGATO:** Holding down a key and pressing another key produces a harmony synchronized to the first waveform. You can hear this in the patch **015:NaNaNaHeyYaa**.



**STEP:** The wave is divided into measures and steps; each time you press a key, another of these regions plays by itself. Try out patch **012:Poppy Day** to hear this.



**EVENT:** The divided wave is assigned to separate keys. This is useful when used with drum sets and vocal phrases.



## Samples that make effective use of VariPhrase (Patch Preview 1)

Unfortunately, merely listening to the factory preset patches does not reveal even half the power of the V-Synth. This is because many of these hitherto-unheard sounds are created by taking advantage, behind-the-scenes, of **VariPhrase** to produce sounds that differ radically from their original form. Let's examine some sounds to see how they work.

As examples, we'll take **007:VoixBulgares**, **012:Poppy Day**, **084:Tetapali**, and **138:Spongole**. Listen and compare these four patches. These patches have totally different personalities, but are actually created from the same wave — **066:137Scat 2+**!

Next let's look at **008:Voco Bass**. This is a typical synth bass, but the original wave is not produced by analog modeling or bass guitar. Amazingly, the wave that underlies this patch is **063:080 MakeGrv +**, which is a vocal phrase! This type of sound-creation is made possible by VariPhrase's ability to extract just the beginning of a wave.

Now try playing **110:Sidewalk**. You can hear a sitar-like phrase loop. While you play, slowly turn the [COSM1] knob located in the [COSM1] section of the front panel. The sense of pitch diminishes until gradually you hear a conga! Notice how certain nuances of the original wave remain as a totally different sound is created.

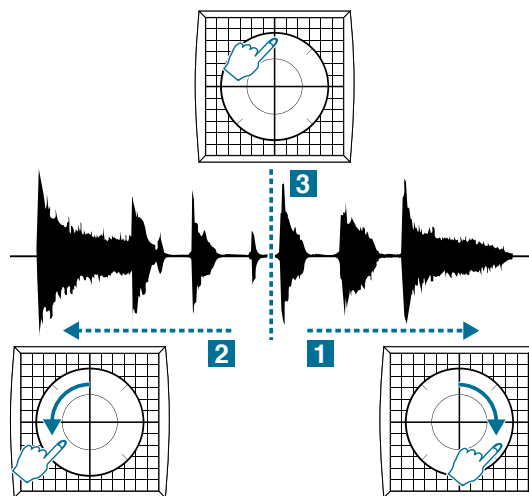
All of these examples demonstrate the V-Synth's synthesis power.

## Sound-making that transcends the time axis (TimeTrip Pad)

The amazing expressive power of VariPhrase technology is typified by the newly developed TimeTrip Pad.

### New performance techniques that differ from scratching or turntables

While playing a rhythm loop from the keyboard, touch the pad and move your finger in a circle. Moving rapidly clockwise speeds up the playback speed of the loop, and moving slowly slows it down **1**. Moving counter-clockwise reverses the playback **2**. When you stop moving your finger, the music freezes! **3** You rule the time domain with your fingertips! VariPhrase gives you expressive power to control wave playback position and speed in realtime. This is somewhat related to a scratching turntable technique, but since you can control time without changing the pitch, you can also play melodies from the keyboard!



### Take conventional instrument sounds on a TimeTrip as well!

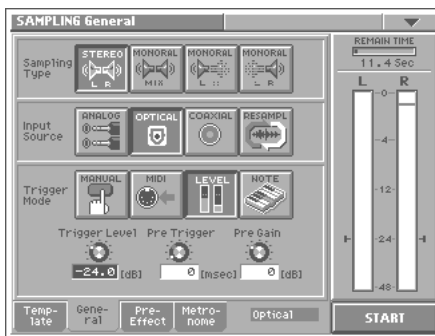
TimeTrip is also effective with source material other than rhythm loops. For example, it's fun to try it out with decay-type sounds such as piano or cymbal. Stopping at the attack portion produces a bright and percussive sustained tone, while stopping at the release portion produces a darker and muted tone. At that point, you can play the keyboard to create melodies! The possibilities are endless; you can create string sounds without absolutely no vibrato or tremolo, or scratch while playing a keyboard solo.

## A revolutionary leap in sound creation potential! — Sampling and audio transfer —

When shipped from the factory, the V-Synth contains 324 different waves. You can also sample sounds from a mic connected to the input jack or from a CD player connected to the optical connector, and you can use up to 999 different waves. The V-Synth is awesomely powerful as a stand-alone instrument, but also provides an interface for connection to your computer, opening up unlimited creative possibilities that can go far beyond your current sound sources.

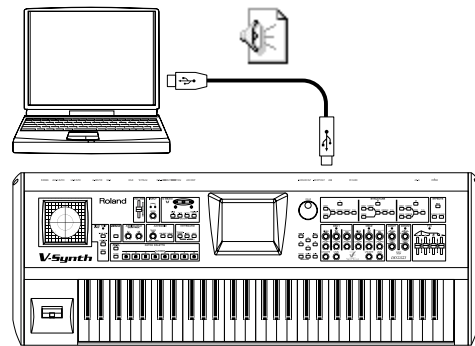
### Sampling functionality that lets you add waves without limit!

The V-Synth provides both analog and digital inputs. Both optical and coaxial digital input jacks are standard. A wide range of sample rates including 44.1 kHz, 48 kHz, and 96 kHz are supported. Naturally, you can apply VariPhrase to the waves you sample. Original vocals, scat vocals, guitar performances and more can be synthesized with independent pitch/time/formant control, delivering immense impact! By radically extending the playback time of a sound, you can find gorgeous sound textures in unlikely audio sources such as the **tick-tock** of a clock, the **plop** of a drop of water or the **click** of a camera!



### Audio transfer lets you exchange waves and patches with your computer

The V-Synth has a USB connector that lets you exchange audio files and other data with your computer. Both Windows and Macintosh are supported, and no driver installation is required. Just use a single USB cable to connect the V-Synth to your computer, and it is recognized as a hard disk drive. As with other drives, you can drag and drop files to copy them. It only takes a moment to back up patch data or save waves sampled by the V-Synth onto your computer. Sound data you've created using your computer-based sequencer or loaded from commercially-available royalty-free sampling CDs can also be imported into the V-Synth. In addition to taking full advantage of the wave data you already have built-in, this lets you use the V-Synth to synthesize any sound in the world!

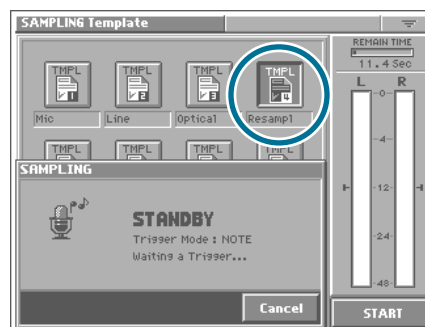


→ "Backing Up your Data" (p. 40)

*\* In order to use the V-Synth as a USB MIDI device from your computer, you must first install the USB MIDI Driver.*

### Resample the phrases you play!

Phrases you play or generate using the arpeggiator can be layered to create loop sequences, and then resampled. You can also use the D Beam or TimeTrip Pad to create extreme tonal changes, and resample them. Already-staggering sounds can then be processed even further by VariPhrase to produce unimaginably radical results! You can create without being hampered by limitations or conventions.



→ "Advanced Sound Programming" (p. 28)

## Proprietary modeling technology! — COSM —

Where conventional synthesizers provide a simple **filter**, the V-Synth instead offers you Roland's proprietary **COSM** (Composite Object Sound Modeling) technology. This sophisticated **modeling technology** has become familiar to musicians from its use in effect processors in hard disk recorders and in multi-effect devices for guitarists. Unlike a filter or an effect, COSM provides unique types of signal processing (15 types) that allow amazing and previously unattainable tonal transformations.

### Side Band Filter creates a sense of pitch

In addition to familiar **TVF** types such as LPF and HPF, COSM makes a number of newly developed filter types available in the V-Synth. Natural sounds always contain inharmonic partials. For example, the **Side Band Filter** can boost the fundamental — which determines the basic pitch — and its inharmonic partials. This means that for the first time, you can create sounds that blast through the boundaries of existing analog synthesizers that create sound only from harmonic partials. Un-pitched sounds such as drums, percussion, or white noise can be given a pronounced metallic pitch or a subtle hint of pitch. While applied in the form of a filter, this feature allows powerful sonic transformations. It delivers yet another radical expansion of sound-making potential.



### Resonator adds the body resonance of a stringed instrument!

The first generation of synthesizers provided keyboards that allowed users to play the desired notes. This led to the view that synthesizers are fundamentally keyboard instruments. The V-Synth breaks through this stereotype, allowing you to create sounds in a manner similar to those you would create on an electric guitar. Popular amps and speakers can be freely combined using the **Amp Simulator** and **Speaker Simulator**, and there's even a **Resonator** that adds the body resonance of stringed instruments. Three types of **Resonator** are provided; **banjo**, **acoustic guitar**, and **resonator guitar**. These go well beyond simple simulations, allowing you to adjust the instrument's perceived body size in fine increments in order to create unique effects.



→ "Basic Sound Parameters" (p. 16)

## A new dimension for visual performances! — V-LINK —

**V-LINK** is a completely new feature that allows realtime performance of synchronized **music** and **images**. By using the V-Synth in conjunction with **V-LINK-compatible** devices (e.g., Edirol DV-7PR, V-4), you can create a wide range of visual performance effects. Simply using the gestures with which you already play music, you can freely control images in realtime.



### Instantly switch image clips as the scene changes! (Patch Palette)

You can switch image clips instantly, and select clips that enhance each section of a song or your stage performance. For example, while playing a lead-type sound, you might display a computer-graphic image that projects a sense of speed, or show a nature scene when playing a pad, or display your band logo or name during the intro and ending of your set.

### Control the image playback speed in realtime! (TimeTrip Pad)

You can dynamically control the speed at which images play back. For example, you might combine this type of control with a phrase loop sound. The phrase and image could play back in their forward direction as you move your finger clockwise across the pad, or backward as you move your finger counter-clockwise. When you stop moving your finger, the music and image would freeze! You can also easily create a wipe between two image clips by sliding your finger to the left and right across the pad.

### Free adjustment of hue and visual effects! (D Beam, C1/C2 knobs)

This is also a great way to vary the color (hue) and brightness of an image. For example, you can use this capability in conjunction with a PCM sound to make the image more red or blue along with changes in the pitch of the sound. Or, the image could become darker as a filter closes, and gradually brighter as the filter opens.

→ "New dimensions of image performance — V-LINK —" (p.42)

# V-Synth



## *Inside the V-Synth - A Tutorial*

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# Inside the V-Synth - A Tutorial

## First Steps

First Steps

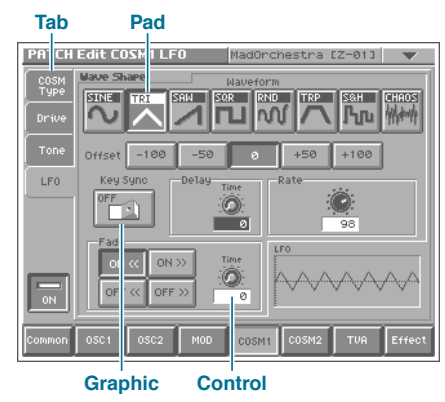
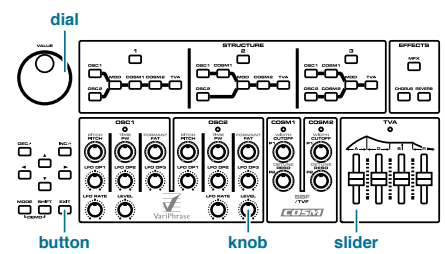
### Introduction

There is quite a lot of "learning by doing" in this tutorial, and to get the most out of it you should follow all the instructions strictly from start to finish. Later parts of the tutorial assume that you have carried out all previous steps to the letter, e.g. that you have saved a sound called **INIT PATCH** to patch number **512**, and one called "**Simplicity**" to number **300**, etcetera. Instructions become progressively terse because you will become more familiar with the programming environment and terminology.

To differentiate between physical and virtual controls, those on the panel are referred to as **KNOB**, **BUTTON**, **SLIDER**, **VALUE DIAL**, whereas those appearing on the screen are referred to as **PAD**, **TAB**, **CONTROL** or even **GRAPHIC** (depending upon function and/or appearance).

**TABS** are used for selecting different pages within a section, and only appear on the left or right of the screen. The combination pitch-bender and modulation control to the left of the keyboard is simply referred to as the **BENDER**.

For the sake of simplicity, only **STRUCTURE** number 1 is used throughout the tutorial. Split and Drum modes are not mentioned for the same reason - for further information, please refer to the **Owner's manual**.



## Trying out the Presets

Before delving into the innermost secrets of the **V-Synth**, you should have a good listen to the presets to appreciate the wide range of sounds the **V-Synth** already has to offer. If you are not currently in **PATCH PLAY** mode, press the **EXIT** button a few times (the mode is always shown in the top left-hand corner of the display) and browse through all the presets using the **INC/+** and **DEC/-** buttons or the **VALUE** dial. Make sure that the patch number is highlighted white on blue first - if not, either touch it on the screen or use the **cursor** buttons. Because most of the factory sounds have been programmed to react, often quite dramatically, to the various left-hand controls (**TimeTrip**, integrated **Bender**, **D Beam** and the two **CONTROL** knobs) you should try all of these with each and every sound!

## The Two Basic Approaches to Programming

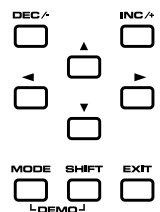
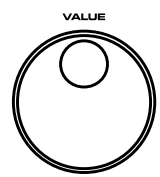
One common misconception about programming synthesizers is that it is always easier to modify an existing sound than to start from scratch. The main problem with modifying existing sounds is that you often have to search for and remove unwanted parameters (which may be affecting the sound quite drastically), and you can easily end up with a very untidy patch structure. On the other hand, analysing existing presets in depth can teach you quite a few tricks. Once you have found out how a certain trick is done, you should then start from scratch and integrate the trick into your own patch. This will improve your programming skills much more effectively than editing existing presets!

*\* After you have learned the basics here, there is of course nothing stopping you from being inspired by some of the existing presets and making them your own*

## Alternative Methods of Setting Values

Like many computer programs, the **V-Synth** gives you alternative ways of selecting parameters and adjusting their values: By touching and dragging controls (or even graphics) on the screen, by touching controls or selecting with the cursor buttons then adjusting values using the **VALUE** dial or **DEC/-** and **INC/+** buttons, or by operating physical knobs, buttons and sliders on the panel. Throughout the tutorial I have tried to choose the simplest method each time, although this sometimes means jumping wildly from one method to another.

*\* The best method of selecting adjacent parameters is to use the cursor buttons*



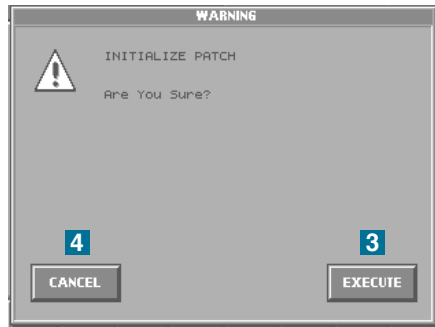
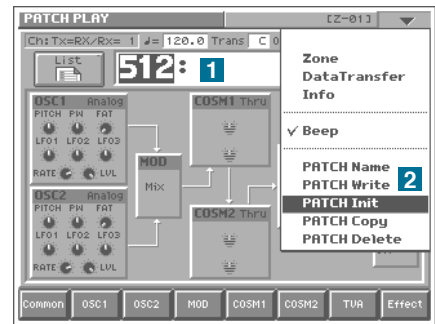
## The Simplest of Patches

The following instructions may seem rather long and needlessly detailed, but there is a very good reason for this – it has to be assumed that you know absolutely nothing about the **V-Synth** architecture or menu structure at this stage. Please take your time and try to be aware of the reason for everything you are asked to do. After you have become more familiar with the programming environment, creating such a basic patch should only take a minute or two.

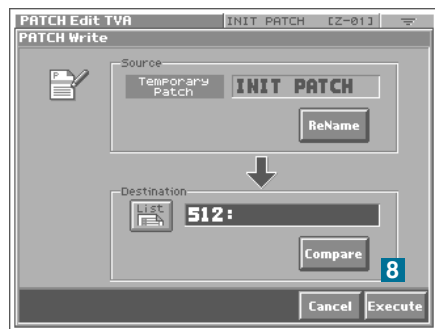
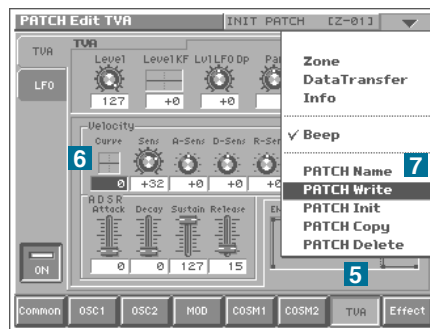
### INIT PATCH

In **PATCH PLAY** mode, use the **VALUE** dial to select patch number **512** – the highest one available **1**. Holding down the **SHIFT** button at the same time will scroll through patch numbers in steps of 10, so this is of course the best method. Touch the triangle in the top right-hand corner of the screen, select **PATCH Init** from the dropdown menu **2**, then touch the **EXECUTE** pad in the bottom right-hand corner of the screen **3**. If you find you have selected a different function by mistake (e.g. **PATCH Write** or **PATCH Copy**), simply touch the **CANCEL** pad **4** or press the **EXIT** button, and try again.

**Tip:** When calling functions from the drop-down menu, you may find it easier to do this all at once: Touch the triangle and don't release immediately. Drag your finger down until the function you want is highlighted – then release!

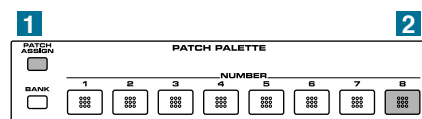


The initial patch already reacts quite strongly to keyboard velocity, and this is seldom desirable when creating new patches. Touch the **TVA** pad **5**, then the Velocity Curve control **6**. Press the **DEC/-** button (below the **VALUE** dial) to change the curve to **0** (flat). Open the dropdown menu again and select **PATCH Write** **7**. Touch the **Execute** pad **8** in the **PATCH Write** window.



**\* You will need this "vanilla" patch throughout the tutorial...**

...so why not put it in the **PATCH PALETTE** for instant recall? Hold down the **PATCH ASSIGN** **1** button and press **8** **2**. To find **INIT PATCH**, just press button number **8** from now on.



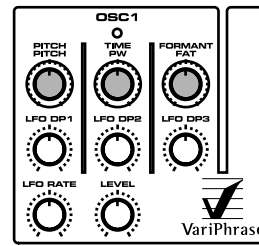
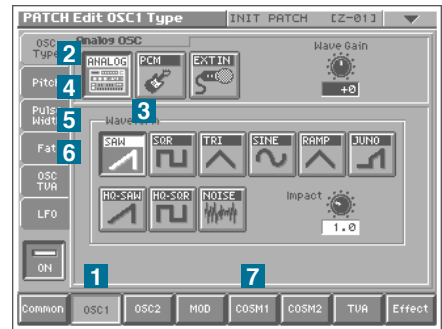
## Simplicity

To introduce you to some of the more basic parameters we'll start by creating a very simple classic analog lead sound. Touch the **OSC1** pad **1** on the screen to open the PATCH Edit / OSC Type page for oscillator 1.

If the screen on your **V-Synth** looks different from the right image, this is probably because one of the other tabs has been selected in this section – touch the **OSC Type** tab **1**. You should be able to hear a simple sawtooth when you play the keyboard. The oscillator type is **ANALOG** **2** and the currently selected waveform is **SAW** **3**.

**\* From now on it is a good idea to play a few notes after each step so that you can hear what difference the parameter makes**

Before we start filtering out some of the higher partials using one of the **COSM** sections, now is a good time to check out the upper row of controls in the **OSC1** section to see how they affect the raw wave: **PITCH**, **PW** and **FAT** (**TIME** and **FORMANT** only apply to PCM oscillators). Hold down a note with your left hand and turn each of these knobs in succession. After you have finished, make sure that **PITCH** and **PW** are in the center and that **FAT** is at minimum. The tabs labeled **Pitch** **4**, **Pulse Width** **5** and **Fat** **6** on the left of the screen give you access to many parameters affecting these three elements, but we will leave them alone for the moment and head straight for the filter: Touch the **COSM1** pad **7**.



Touch the **TVF** **1** pad to select a conventional filter algorithm for the COSM1 section. Touch the **24db/oct** pad **2** to change the filter to a 4-pole Lowpass type. Touch the **Cutoff** tab **3** to access the Cutoff page.

Take the filter cutoff frequency down to **64** by turning the upper knob in the **COSM1** section to the center. The sound is now very mellow. To turn this into a typical analog lead sound we have to apply some filter envelope...

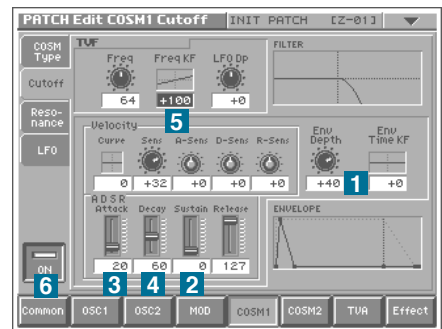


Touch **Env Depth** (Envelope Depth) **1** and take the value up to **+40** by holding **SHIFT** and pressing the **INC/+** button four times. Take the **Sustain** **2** value down to zero by flipping the physical S slider (in the **TVA** section) all the way down. Touch **Attack** **3** and keep your finger on the screen. Change the value to around **20** by dragging your finger upwards (you can make fine adjustments with the **DEC/-** or **INC/+** buttons). Press the cursor-right button to select the **Decay** parameter **4** and change its value to **60** by holding down **SHIFT** and moving the **VALUE** dial clockwise.

You have just been introduced to many different methods of selecting controls and adjusting values – and not always the best ones! Choosing the best method according to the circumstances is far quicker and more precise than using e.g. touch-and-drag for each and every parameter.

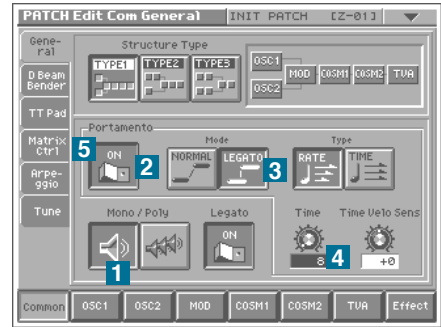
Touch **Freq KF** (Frequency Keyboard Follow) **5** and change the value to 100% (I'll leave the method up to you this time). This balances out the filter cutoff frequency across the keyboard – lower notes become mellower and higher notes become brighter, just like in many acoustic instruments. If you like, try different values and play the keyboard to get a feel for what this parameter does, then set it back to 100% again.

The sound is still polyphonic, which is not very typical of analog lead sounds, so touch the **Common** pad **6**. Touch the **General** tab if this page isn't already active.



Touch the **Mono** pad **1** and switch **Portamento** on **2**. The sound is now monophonic, but portamento (glide) is applied to every note you play even if you leave gaps between notes. To remedy this, change the Portamento mode to **LEGATO** **3**. The glide effect is a bit too slow. Reduce the **Time** parameter **4** to about **8**.

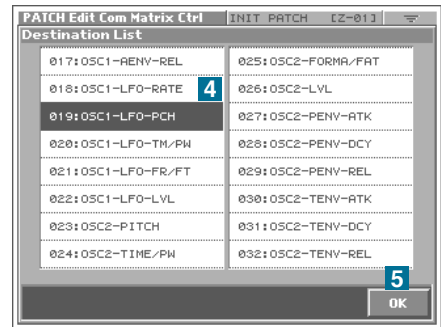
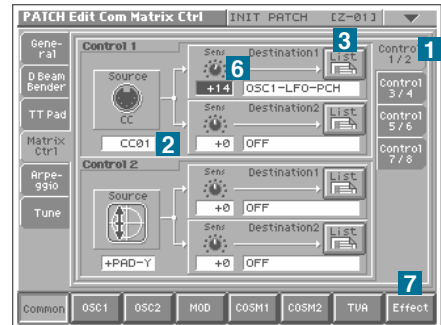
Before adding some delay effects (this sound is still completely dry), we could make the Bender add some vibrato for extra expression. Touch the **Matrix Ctrl** (Control) tab **5**.



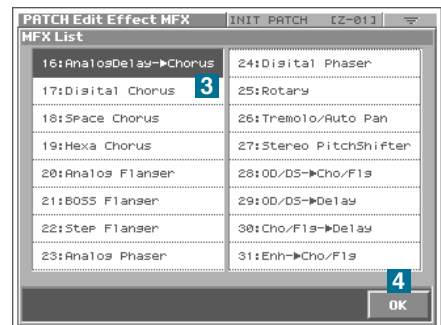
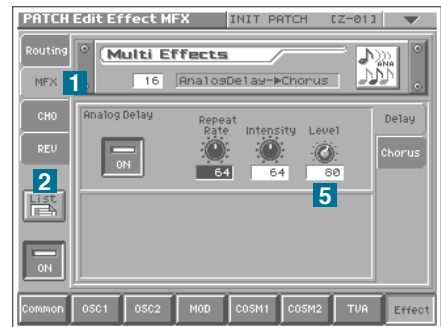
Touch the **control 1/2** tab **1** and change the **control 1** source **2** to **CC01** using the **VALUE** dial. As **CC01** is the very next source in the list after **OFF**, you can hold **SHIFT** and turn **VALUE** anticlockwise to quickly reach the beginning, then either move the **VALUE** dial one "click" in the other direction or press the **INC/+** button.

\* **CC01** is defined as "Modulation" in the MIDI standard specifications. On the V-Synth, this type of data is transmitted by pushing the Bender away from you

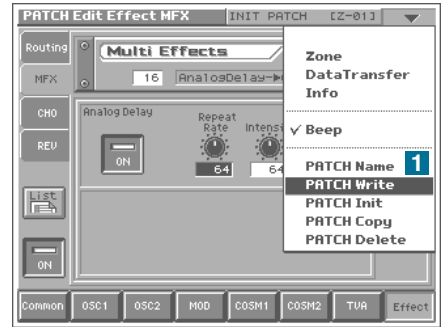
Open the **Destination1** list **3** and select parameter **019:OSC1-LFO-PCH** (oscillator 1 LFO to pitch) by turning the **VALUE** dial **4**. Touch **OK** to confirm **5**, then press the cursor-right button to select **Sens** (Sensitivity) **6**. This parameter determines the maximum depth of the modulation, in this case how much vibrato you will get when pushing the bender to its limit. A value of **+14** is enough here. Now touch the **Effect** pad **7** to access the Effects section.



Touch the **MFX** (Multi Effects) tab **1**. Touch the **List** button **2** and select algorithm **16:AnalogDelay** → **Chorus** using the **VALUE** dial **3**. Confirm your selection with **OK** **4**. Change the **Level** to **80** for a more subtle mixture **5**.

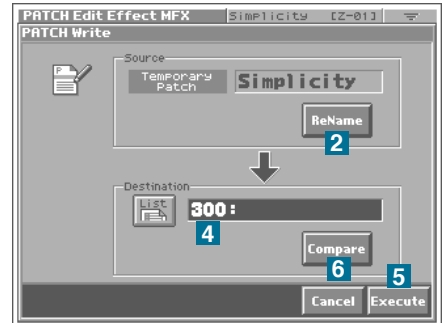


Although this sound is still very primitive, it's about time we named and saved it to make sure that all the work done so far is not lost. Open the drop-down menu (via the triangle) and select **PATCH Write** **1**.



Now touch the **Rename** pad **2**. Enter a suitable name: **"Simplicity"**.

At this point you might like to try out all the pads in this page, for instance **Shift** gives you capitals instead of lower case letters and symbols instead of numbers. Confirm with the **OK** pad in the bottom right-hand corner of the screen **3**. To save the sound to an unused location (300), change the **Destination** using the **VALUE** dial **4**. When you are sure the destination number is correct and that you are not overwriting any patch you might need in future, touch the **Execute** pad **5**. Note that you can **Compare** **6** a sound to the original before overwriting.



We'll be improving "Simplicity" later on, so please make sure you have saved it.

Now it's time to learn a little more about each individual section in your **V-Synth...**

## ▶ ▶ ▶ Basic Sound Parameters

This chapter only deals with those sections which are directly involved in sound generation and treatment. For information about programming the Arpeggiator or applying realtime controllers (**TimeTrip**, **D Beam**, **Bender** and **Control** knobs), please refer to the chapter "**Advanced Performance**" towards the end of this tutorial. For information about Sampling and more advanced programming, see the chapter "**Advanced Sound Programming**" below.

Practical instructions here are in a much more compact form than those above because I assume that you already know your way around the menus. Look in the **Owner's Manual** under "**Creating a Patch - Functions of Patch Parameters**" whenever you need detailed information about individual parameters. Although each section will be dealt with in turn, you

will be guided towards other sections in the **V-Synth** whenever necessary. This will help you get used to switching between sections and guard against seeing each one as a separate, unrelated entity.

*\* In practice, creating a good patch usually means jumping back and forth between parameters rather often. Synthesizer modules/sections are, by their very nature, highly interactive*

Because the Effect section is dealt with last, the sounds will only start coming to life towards the end of this chapter. If you find dry sounds generally tiring to the ear, you can always add some internal or external reverb.

## The OSC1 / OSC2 Sections

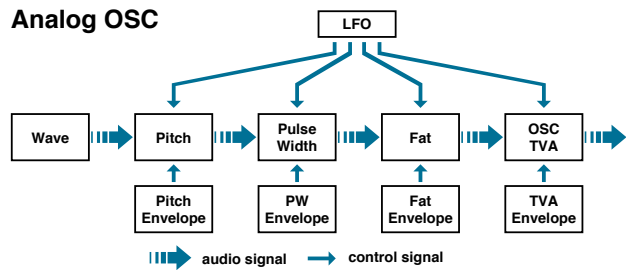
Go to **512:INIT PATCH** and touch the **OSC1** pad...

For each of its two oscillators (per Zone), the **V-Synth** gives you the choice of two fundamentally different types - **Analog** and **PCM**. Whichever you choose, many of the parameters are practically the same. There is a third option which will be mentioned later on: **EXT IN** causes signals from the two **INPUT** jacks to be routed directly to the **MOD** section.

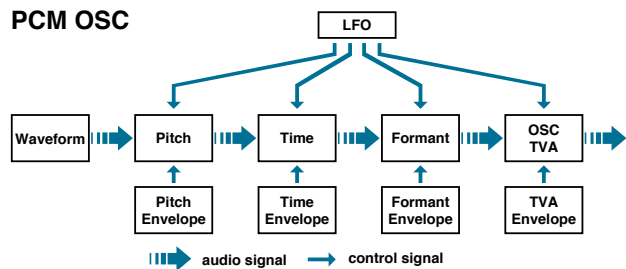
As these diagrams clearly show, the signal passes through several stages, each with its own dedicated envelope but with a single, shared LFO. This means that the main parameters (**Pitch**, **Time**...) in each of the four stages can be modulated by individual envelopes as well as by a common LFO.

*\* Any audio signal that's been input while the oscillator type on the V-Synth is set to EXT IN will be heard only when you play the keyboard. In other words, the simple act of inputting a sound is not enough to cause it to be heard. Note that the signal from the DIGITAL INPUT is not allowed to be used as a source for EXT IN.*

**Analog OSC**



**PCM OSC**



This is what you see when you select **PCM** in the **OSC1** section and touch the **Pitch** pad, but the corresponding page for analog oscillators looks the same. If you touch each of the other tabs in succession, you will see that they have a similar layout - except for the **LFO** page of course.

## PITCH (Analog or PCM)

This page is used for setting all parameters which affect oscillator pitch. Try turning up the LFO **DP1** knob (DP stands for "depth") to add some vibrato. If you like, go to the LFO page (touch the LFO pad) and experiment with the parameters for a while.

Pitch modulation from the envelope is best demonstrated by turning **Env Depth** up to something drastic like **+50**, setting **Sustain** to zero and then adjusting **Attack** and **Decay** to taste.

**\* Which methods did you use to select and change all these values?**

Could you have made some of the adjustments much more quickly or precisely by using the knobs, buttons and sliders on the panel? The answer to this question may only mean 5 seconds difference for each adjustment you make, but this can add up to many hours in the long run!

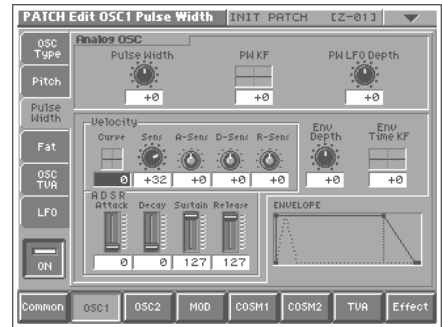
## PULSE WIDTH (Analog only)

This is where you can add automatic modulation and adjust various other pulse width parameters, but you should first be aware of the different effects Pulse Width has on each of the waveforms. Go back to the OSC Type page, select another waveform and manually turn the **PW** knob in the **OSC1** section.

Note that **PW** has no effect on the **HQ-SAW** waves. Pulse width is normally defined as the ratio between the upper and lower plateaus of a pulse wave, but in the **V-Synth** this term is also used for similar effects available for most of the other waves. Now try adding pulse width modulation from the LFO by turning up the LFO **DP2** knob in the **OSC1** section.

## FAT (Analog only)

The Fat page looks almost exactly the same as the Pulse Width page. Go back to the OSC Type page, select each waveform and turn the **FAT** knob in the **OSC1** section to see what effect Fat has on the sound. If you return to the Fat page at any point, you will see the value changing as you turn the knob. Note that **Fat** also has no effect on the three waveforms: **HQ-SAW**, **HQ-SQR** and **NOISE**.



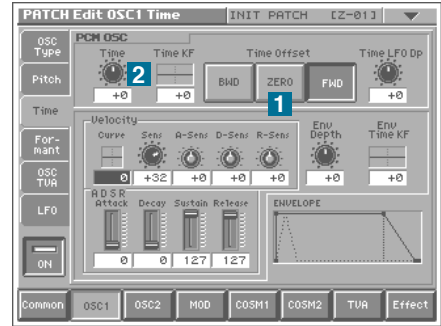
## TIME (PCM only)

### Mad Orchestra

Press **EXIT**, then step down and up a patch to remove any edits you have made. Press the **OSC1** pad and change Osc Type to PCM instead of Analog. Use the cursor up/down buttons (if necessary) to highlight the waveform number, then change this to number **043**, "**120 PFLick1+**". If you play a note you should now be able to hear a piano arpeggio sample.

Touch the **Time** tab so you can see the **Time** value. Touch the **ZERO** pad **1**. Play the keyboard, watch **Time** change as you take it slowly up to **+63** (using the **OSC1 / TIME** knob) and then all the way down to **-63** **2**. This is **VariPhrase** and not conventional sampling, in case you hadn't already noticed!

Now set **Time** to **-1** by turning the TIME knob back to the center, touching the **Time** control and pressing the **DEC/-** button. Play a bunch of random notes in the center of the keyboard. Do you recognize this sound? It is the basis for the first patch in your **V-Synth**, "**001:MadOrchestra**". Of course you can modulate the **Time** parameter from its own dedicated envelope or from the LFO. Later on you will learn how to modulate parameters using any realtime controls you like (**TimeTrip**, **D Beam**, **C1** and **C2**, **Bender**, keyboard velocity, aftertouch) by defining sources and destinations in the modulation matrix.



## FORMANT (PCM only)

This page is grayed out because the currently used waveform is of type Ensemble - see the section on "**Creating and Editing Samples (Sample Mode)**" in the **Owner's Manual** as well as the section "**Sampling and Encoding**" later on in this tutorial.

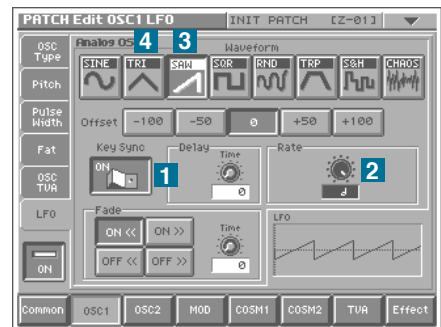
We need a waveform of type Solo (or Lite) to demonstrate how formants can be manipulated in realtime. Press **EXIT**, then step down and up a patch.

Go to the **OSC1 / OSC Type** page, select PCM and change the waveform to **067**, "**088:NaNana+**". Activate Tempo Sync (a pad in the bottom right-hand corner of the page) and reduce the tempo a little using the **TEMPO** knob in the **ARPEGGIO** section. Play a chord with your left hand and add a higher note afterwards with your right hand. The new note will be retriggered i.e. probably out of step with the other voices, so change the Playback Mode to Legato. Try the chord and the additional note once again - everything is now in step. Now experiment with the **OSC1 Formant** knob...



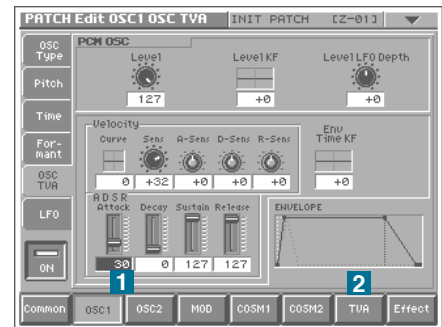
### Hey You!

Take FORMANT back to the center, then turn the LFO **DP3** knob up to maximum for some deep and rapid formant modulation. Go to the LFO page, activate **Key Sync** **1** and change the **Rate** to one of the musical notes you will find after reaching **127** **2**. If you have selected a minim here (the empty circle with a tail), changing the LFO waveform to **SAW** **3** will give you "NunnaNaah HooYaah", and **TRI** **4** will give you "NannaNoo HeyYou". To turn this into "HeyYou NannaNoo", go to the Osc Type page and take **Start Offset** up to about **40000**. You should use **SHIFT + VALUE** to do this, otherwise it would take forever! Save this patch under the name "Hey You!" to patch number **301**.



## OSC TVA (Analog or PCM)

This gives you control over individual oscillator volume. Because the “Hey” in your “Hey You” patch starts rather abruptly, you can smoothen it here by changing the **Attack** to around **30** **1**. You will find that the **R (Release)** setting has no effect yet because the main **TVA** release time is currently very short. Open the **TVA** section (by touching the **TVA** pad **2**) and change the **Release** value to **30**. Save the patch again.



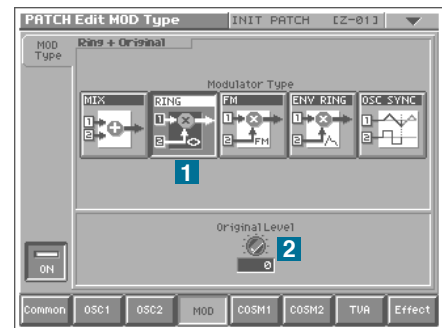
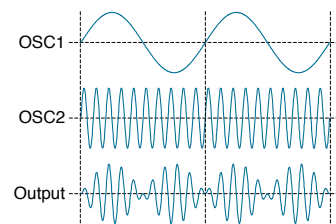
## The Mod Section

As well as standard mixing (**MIX**), the modulation section offers Ring Modulation (**RING**), Frequency Modulation (**FM**) or Synchronization (**OSC SYNC**) between the two oscillators, as well as an envelope follower controlling oscillator 1 volume (**ENV RING**). Let's experiment with each of these algorithms in turn. For further details about each parameter, please refer to the **Owner's Manual** under “Creating a Patch – Mixing/Modulating Two Sounds”.

### RING

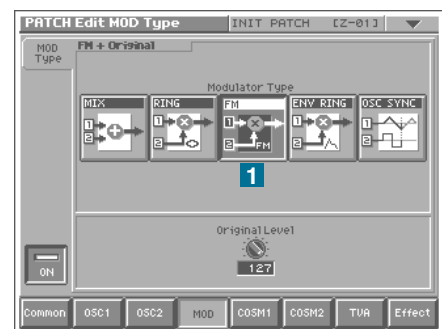
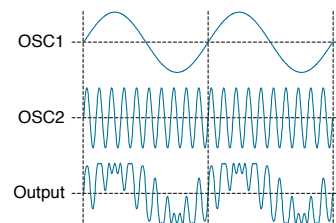
Ring Modulation adds complexity to the sound by multiplying two input signals (oscillators 1 and 2) together. When the waveforms of both inputs are fairly pure, you can get bell-like sounds. Go to **512:INIT PATCH** and activate oscillator 2 – you can press the lower of the two buttons next to the **VALUE** dial. Set both oscillators to **SINE**, then change the Modulator Type to **RING** in the **MOD** section **1**. Take the Original Level down to **0** **2**. Experiment with both **PITCH** knobs and adjust overall pitch in the Common / Tune page.

You might also like to experiment with the other knobs in the OSC sections. Of course ring modulation is not only useful for bell-like sounds – you can use any oscillator types you like, including external input. Remember that if the sound is too harsh, you can mellow it with a Lowpass filter (in one of the **COSM** sections). We'll get to that soon.



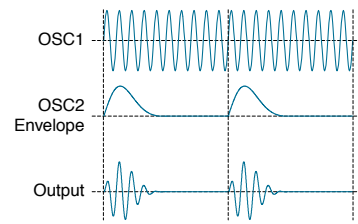
### FM

Frequency modulation of one signal (oscillator 1 is the carrier) by another (oscillator 2 is the modulator) is also a good source of complex sounds. Press **EXIT** and step down and up a patch to remove all your edits. Activate oscillator 2 again and change both oscillators to **SINE**. Select **FM** in the **MOD** section **1** and turn the **OSC2 PITCH** knob only. Because this is the modulator and not the carrier, doing this won't change the fundamental pitch of your sound. Again, you should experiment with all the other oscillator types.

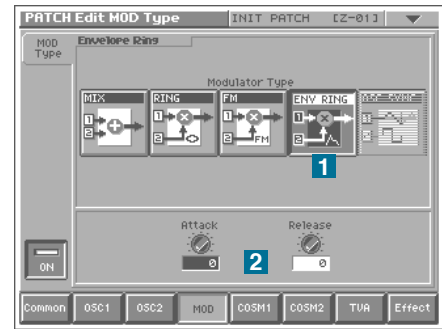


## ENV RING

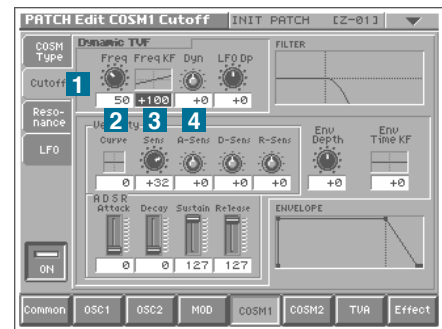
This is basically an envelope follower whereby the volume of oscillator 1 is controlled by the audio “envelope” of oscillator 2 i.e. its volume at any given time. Patch number **179:Shakin’Str** uses an internal sampled percussion loop (**055 Shakin’+**) and shows off the effect very well (play the lower half of the keyboard). However, here is a good opportunity to hook up an external audio source to your **V-Synth...**



Start from **INIT PATCH** again, activate oscillator 2 and set the Type to **EXT IN**. Select **ENV RING** in the **MOD** section **1**, go to **OSC1** and change the waveform to **SAW**. Feed a drum loop or drum computer into the **V-Synth’s** inputs and play a chord. To accentuate the rhythmic effect, use only very short percussive sounds with no reverb etc. You can always soften the rhythmic effect by adjusting **ENV RING’s** own **Attack** and **Release** parameters **2**.

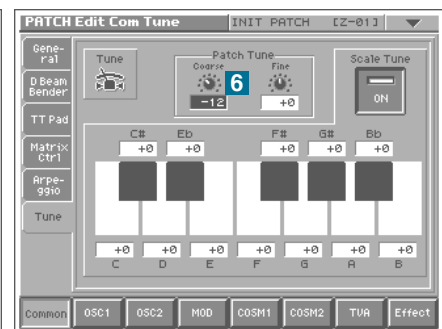
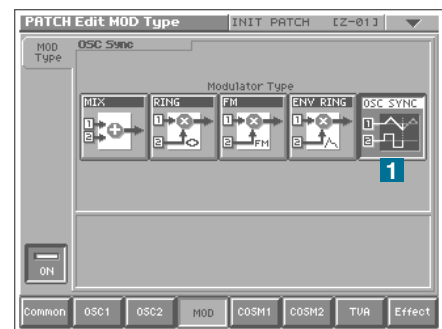
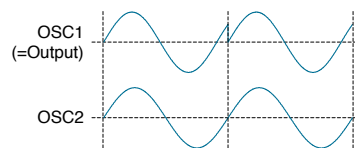


**ENV RING** is very good in combination with dynamic filtering e.g. Auto Wah (available as Multi Effect), but we are going to “jump the gun” here and use a similar (but polyphonic!) **COSM** effect. Select **COSM1** and change the Type to **DYN-TVF**. Touch the **Cutoff** tab **1** and take Cutoff frequency (**Freq**) down to around **50** **2**, **Freq KF** to **+100** **3** and **Dyn** (input Dynamics) up until it sounds interesting **4**. Note that you might also have to adjust the volume of the sound source or the Cutoff frequency again. Try going to the Resonance page and take the Reso and/or DynEnv parameter up for a much more squelchy sound.



## OSC SYNC

This algorithm resets the phase of oscillator 1 every time oscillator 2 repeats its cycle, and can have a similar effect to sweeping a filter with high resonance and overdrive if oscillator 1 pitch is modulated. Start again from scratch i.e. the **INIT patch** in program number **512**, activate oscillator 2 and set both oscillators to **SQR**. Go to the **MOD** section and select **OSC SYNC** **1**. Experiment with the **OSC1 PITCH** knob, then set it to the center again. Go back to **OSC1** and touch the **Pitch** pad **2**. Flip **Sustain** down to **zero** using the slider and change **Decay** to **40** **3**. Change the **Velocity Curve** to **1** **4** and **Env Depth** to **+50** **5**. Tune everything down an octave **6** in the **Common / Tune** page (Course = -12) and play single notes on your keyboard as dynamically as possible – you might recognize this type of sound from countless Techno tracks!



## The COSM Sections

Although these two sections may appear to contain a bunch of add-on effects (like in the **V-Synth's** own Effect section or a stand-alone effects unit), **COSM** is fundamentally different. It is polyphonic i.e. the effects will be applied separately to each and every note you play! Start again from scratch (**512:INIT PATCH**) and touch the **COSM1** pad. The available COSM algorithms can be divided into four basic categories: Guitar Modeling (the top row), Filters (the middle row), Dynamic Processing and Special Effects (both in the bottom row).

\* Firstly, the six guitar-modeling algorithms:



### OD/DS (OverDrive / Distortion)

Select the PCM type for oscillator 1 and change the waveform to number **161 "Clean Gt Lo"**. You should be able to hear a half-muted electric guitar sound. Select **OD/DS** in the **COSM1 / COSM Type** page **1**. The sound is now completely overdriven. If you prefer a little more movement within the sound, select the **Drive** tab **2**, change the Drive value to **64**, flip **Sustain** down to minimum, change **Decay** to about **35** and take **Env Depth** up to **+63**. For a "rounder" guitar sound, select the drive type **DS** **3**, touch the **Tone** tab **4** and change the value of the Tone parameter to around **64**. Of course you can apply an envelope to either or both of these parameters (Drive, Tone) and even make them velocity sensitive...



### W-SHAPE (Wave Shaper)

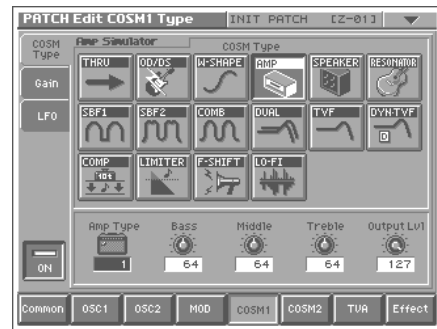
#### Barinet

This is an alternative method of adding high-frequency partials to a waveform, at the same time attenuating some of the lower frequencies. Although grouped under the "guitar modeling" algorithms, I find this one particularly suited to sustained sounds. For instance, let's turn a clarinet sound into an edgy baritone-sax: Start from **512:INIT PATCH**, select the **PCM** type for oscillator 1 and change the waveform to number **113 "Clarinet Vib"**. Go to **Common / Tune** and take the overall Patch Tune (Course) down an octave (-12). Go to **COSM1 / COSM Type** and select **W-SHAPE** **1**. Change the **Shape Type** to number **4** **2**. Touch the **Drive** tab **3** and reduce the **Drive** value to around **100**. Play low notes on your keyboard.



### AMP (Amplifier Emulation)

Because it is polyphonic, "power chord" type interaction between notes is not possible using **COSM** (the Effects section is much more suitable for that). However, this algorithm can be very useful for adding very typical amplifier distortion when using **COSM2** for **Speaker Emulation**. Try it!





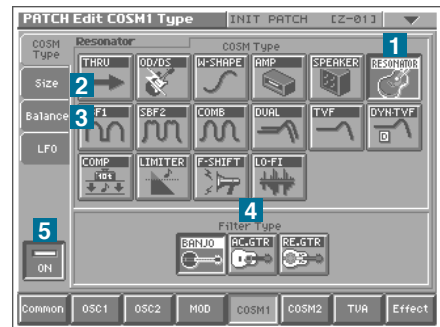
## SPEAKER (Speaker Emulation)

The only parameter here is the **Speaker Type** control, which selects one of 12 preset equalization settings which mimic the frequency response of different speaker cabinet models. Particularly useful for guitar sounds in combination with **Amplifier Emulation** (see above).



## RESONATOR (Hollow-body Emulation)

This **COSM** algorithm is actually a formant filter. To get an idea of how much this effect can color a sound, recall **512:INIT PATCH**, select the **PCM** type for oscillator 1 and change the waveform to number **158 "Nylon Gt Hi"**. Go to the **OSC TVA**, flip **Sustain** to minimum and **Decay** to around **70**. Select **COSM1 Type RESONATOR 1**, touch the **Size 2** tab and change the value of Size to **110**. Touch the **Balance 3** and take Balance up to maximum (**100**). Now return to the **COSM Type** page and try out the 3 different Filter Types **4**. Compare them with no effect at all by touching the pad labeled **ON 5**. Of course different values for Size are more suited to particular Filter Types, and you can make these effects more subtle by turning Balance down a little.



\* Secondly, the six Filter algorithms:



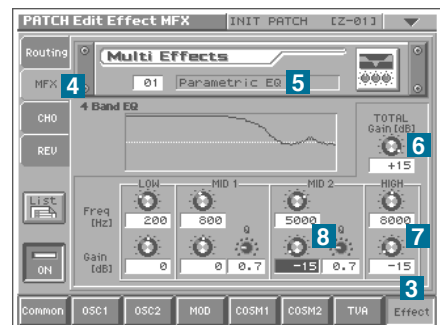
## SBF1 (SideBand Filter 1)

### Karplus 1

Very useful for adding/subtracting frequencies from drum sounds. Although called filters, this and the following two **COSM** algorithms are actually based on extremely short delays, and can therefore be used for "Karplus-Strong" physical modeling of plucked strings...

Start from **512:INIT PATCH** and select **NOISE** for oscillator 1. Touch the **OSC TVA** tab and take **Sustain** down to minimum. You will hear a very short burst of noise. Go to **COSM1** and select **SBF1 1**. You should now be able to hear a quiet and short plucked string sound. Touch the **Width 2** and take the Width value down to **2** - this makes the decay longer but also makes it much quieter. Go back to **OSC1 / OSC Type** and take **Wave Gain** up to maximum (**+12**) to give the filter more impulse to work with. Note that the filter frequency is directly linked to oscillator 1 pitch (try turning the **PITCH** knob in the **OSC1** section) and that it can be finely adjusted with the **DETUNE** knob in the **COSM1** section.

Because the sound is still too quiet (and a little too harsh at the top), Touch the **Effect** pad **3**, then the **MFX** tab **4** and change the Multi Effects algorithm to number **01, Parametric EQ 5**. Take **TOTAL Gain** up to maximum (**+15**) **6** and remove some of the high frequencies by setting **HIGH** to minimum (**-15**) **7**. It's well worth experimenting with all the Frequency, **Gain** and **Q** values while you are here. Especially removing some frequencies around **5000 Hz** makes the sound much warmer **8**. Also, try turning oscillator 1's **PW** knob down just a little! Save your sound to program number **302** under the name "Karplus 1".





## SBF2 (SideBand Filter 2)

Similar to **SBF1**, but with stronger resonance.

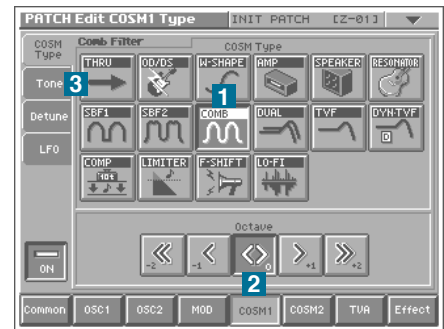


## COMB (Comb Filter)

Comb filters in general use several delay lines to boost or attenuate a series of frequencies. The filter frequencies in the **V-Synth** version follow the harmonic series, so it can be used as a static effect to isolate or remove noise or to boost/attenuate partials within a waveform:

### Removing / isolating the noise component of waves

Start from **512:INIT PATCH**, select **PCM** for oscillator 1 and change the waveform to **086:F Ahs Mid**. Go to **COSM1**, select **COMB 1**, change the Octave to **0** (zero) **2** and **Tone 3** to **64** (the Thru position). Turn the **P1** knob (which controls Tone) in the **COSM1** panel all the way down to isolate the noise component. Turn it up to remove the noise i.e. all the inharmonic partials!



### Adding / subtracting partials

Start from **512:INIT PATCH**, select **ANALOG** for oscillator 1 and change the waveform to **SAW**. Go to **COSM1**, select **COMB**, change the **Octave** to **+1** and **Tone** to **64** (thru) **4**. Turn the **P1** knob in the **COSM1** panel all the way down to remove all the even-numbered partials. The sound of the oscillator will now be very similar to **HQ-SQR** (which only contains odd-numbered partials). Now try turning the **P1** knob up - even-numbered partials are emphasized and the sound, though very similar to the original wave (sawtooth) is now an octave higher.

Of course the **Tone** parameter can be controlled in the Matrix (via the **CSM1-PRM1** parameter). See "**The Matrix - Assigning Destinations**" below.





## DUAL (Dual Filter)

Similar to the standard **TVF** (see below), but with two 12dB/octave filters, either in parallel or in series. The filters can be routed in three different ways: parallel LowPass / HighPass, serial LowPass → HighPass, and parallel BandPass / BandPass.

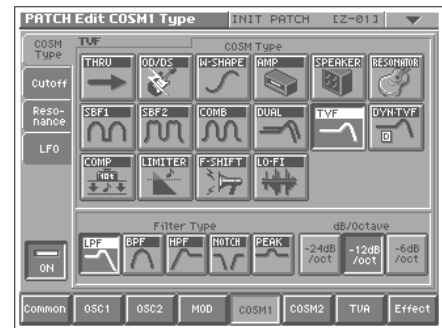


## TVF (Time-Variant Filter)

A variation on the standard filter you will find on any subtractive synthesizer, but with a total of 12 different types:

<b>LPF</b>	Low Pass Filter. Removes frequencies above the Cutoff point.
<b>BPF</b>	Band Pass Filter. Removes frequencies above and below the Cutoff point.
<b>HPF</b>	High Pass Filter. Removes frequencies below the Cutoff point. 3 different slopes.
<b>NOTCH</b>	Often called Band Reject or Band Stop. Removes frequencies around the Cutoff point.
<b>PEAK</b>	Accentuates frequencies around the Cutoff point.

That was only five, but each of these types are available with different slopes (dB per octave). For an easy example of what to do with a Lowpass filter, see the section “**The Simplest of Patches**” above.



## DYN-TVF (Dynamic Time-Variant Filter)

Basically the same as **TVF**, but with an additional parameter called **Dyn** (touch the **Cutoff** tab to see this) which applies Cutoff modulation from the audio-envelope of oscillator 2 (or from the inputs when oscillator 2 Type is **EXT IN**). See **ENV RING** in “**The Mod Section**” above!

\* *Thirdly, the two dynamic processing algorithms:*



## COMP (Compressor)

### Compress Tom

Compression is the audio-engineer’s “secret weapon” used to manipulate several attributes of pre-recorded sound. For instance, it can add punch to a drum...

Restore **512:INIT PATCH**, select **PCM** for oscillator 1, with Waveform **239 “RockTom Lo”**. Listen to this sound for a while, then go to **COSM1** and select **COMP 1**. Take both **Attack** and **Sustain** up to **70** and the **Output Level** down to **105** **2** so that the volume is about the same whether or not the compressor is active. Now compare the original with the treated sound by repeatedly touching the **ON** button **3**. Note that compression can also accentuate the ambient tail of a sound: Play a note and hold it...

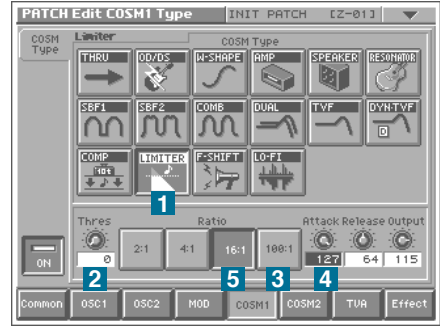
The compressor in the **COSM** section is fairly simple (with only two main parameters - **Attack** and **Sustain**), but like all **COSM** algorithms, it is polyphonic. For a more typical and flexible stereo compressor, see **MFx** number **09 (Dynamic Processor)** in the **Effect** section.





## LIMITER

Limiting is a more primitive form of compression where any peaks above a fixed threshold are reduced to exactly this level. Start from the Tom sound you have just made, and select **LIMITER** instead of **COMP** in the **COSM1** section **1**. For the most drastic settings, take **Threshold** to **0** **2** and **Ratio** to **100:1** **3**. What is happening here is that you have told the limiter to reduce any signal level whatsoever by a factor of 100 to 1. You can still hear a click because the limiter needs a certain minimum time to react. Turning **Attack** up to maximum will increase this time a little **4**. Now select the lower ratios, starting with **16:1** **5** and experiment with the other parameters (particularly Threshold).



\* And finally, the two special effects algorithms:

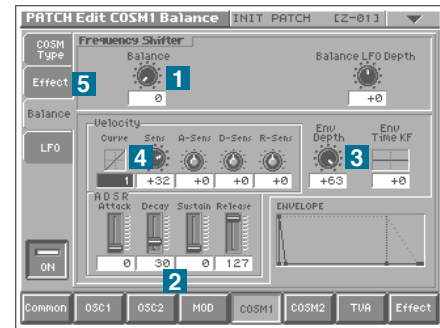


## F-SHIFT (Frequency Shifter)

### Inharmonics

As well as standard pitch-shifting (which you should also try out of course), I find this **COSM** effect particularly useful for adding inharmonic partials to the attack part of a sound. A little experiment: Start from **INIT PATCH**, select **SINE** for oscillator 1 and change the **Impact** value (also in the OSC Type page) to **0.0**. Go to **COSM1** and activate **F-SHIFT**. Touch the **Balance** tab and take the Balance control right down to zero **1**. Flip **Sustain** down to **zero** and change the **Decay** to 30 **2**.

Take **Env Depth** up to **+63** **3** and change the **Velocity Curve** to **1** **4**. Touch the **Effect** tab **5** and adjust the **Effect** value (i.e. the amount of Shift) to taste.



## LO-FI (Low-Fidelity)

This is a combined bit-depth and sample-rate reducer used to add the typical grunge you get from early samplers. These machines (e.g. the original Fairlight CMI) were typically 8-bit, with a sample rate well below CD-quality (44.1 kHz), and therefore have a special "quality" compared with today's machines. Although seen as a serious drawback at the time, Low-Fi artifacts are now quite fashionable, especially in Hiphop and Techno circles.

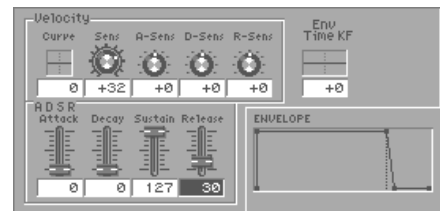
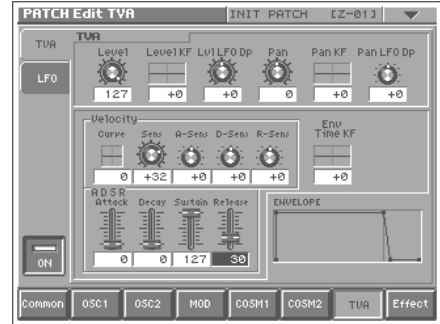


## The TVA Section

**TVA** stands for **Time Variant Amplifier**, and this is the section which governs the overall volume of each note while it is being played - including master volume (Level), the envelope itself, keyboard velocity, panning and tremolo (via the dedicated LFO). Having been introduced to envelopes earlier in this tutorial, you should already know how to set up the most important parameters, but I will go into more detail here.

\* *The TVA sliders on the panel can be used for any of the V-Synth envelopes - whenever one is visible on the screen!*

If **TVA** is deactivated, this is practically the same as setting maximum level, minimum **Attack** and **Decay**, maximum **Sustain** and **Release** of **15**. **Release** is not **zero** here because cutting the sound off too suddenly would cause a click. Start with **512:INIT PATCH** and try out the following:



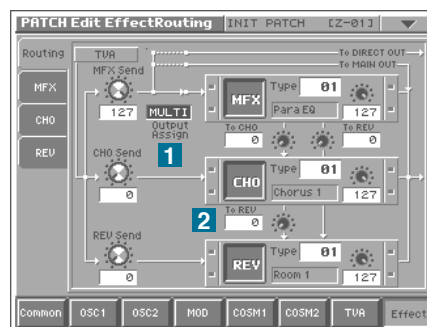
<b>Level KF</b>	Level KeyFollow. Level follows the MIDI note - try setting -200 and play all the 'C' notes on the keyboard starting from the lowest one. Then set Level KF to <b>+200</b> and play each of these notes again. You should now know what "KeyFollow" means! Set <b>Level KF</b> back to <b>+0</b> and press the cursor-right button to highlight the next parameter...
<b>Lvl LFO Dp</b>	Level LFO Depth. Amplitude modulation from the <b>TVA's</b> own dedicated LFO. Useful as a tremolo effect - try different values. Set <b>Lvl LFO Dp</b> back to <b>+0</b> and press the cursor-right button again...
<b>Pan</b>	Panorama. This moves the sound to the left or right. Try extreme values, then take it back to zero.
<b>Pan KF</b>	Panorama KeyFollow. In a similar way to Level KF, the panorama position will follow the notes on the keyboard. Note that panning is polyphonic, i.e. if you play the lowest and highest notes on the keyboard at the same time, they will be split in the stereo field. Try it!
<b>Pan LFO Dp</b>	Panorama LFO Depth. Try extreme values for a deep stereo tremolo effect.

<b>Curve</b>	At zero, this is flat i.e. the level (as well as some other values we will come to shortly) is always the same, no matter how hard you play the keyboard. The small graph indicates keyboard velocity in the X-axis, and how this is translated into levels in the Y-axis. For instance <b>Curve 1</b> means that keyboard velocity is translated linearly, whereas <b>Curve 3</b> means that it will take a lot more energy to reach medium levels. Try playing the keyboard very dynamically using each of these curves in turn - you will soon get a feeling for each one, and understand intuitively what each individual graph depicts.
<b>Sens</b>	Sensitivity. This parameter governs the degree to which keyboard velocity will affect Level. The default value is <b>+32</b> , but with <b>Velocity Curve</b> at <b>1</b> , values around <b>+27</b> are better (for my personal playing style at least). Note that setting negative values here will make the sound softer the harder you play. Set <b>Sens</b> to <b>+0</b> so you can hear the effects of the following parameters in isolation:
<b>A-Sens</b>	Attack Sensitivity. The Attack time is affected by how hard you play the keyboard. Try setting <b>A-Sens</b> to <b>+63</b> and the nominal Attack (using the <b>A</b> slider) to <b>40</b> , then alternate between playing very softly and very hard. When you are finished, take both <b>A-Sens</b> and <b>Attack</b> back to zero.
<b>D-Sens</b>	Decay Sensitivity. The Decay time can also be affected by keyboard velocity. To make Decay longer when you play harder, you will have to set negative values here. Set <b>D-Sens</b> to <b>-50</b> , <b>Decay</b> to <b>50</b> and <b>Sustain</b> to <b>zero</b> . Alternate between playing very softly and very hard, then set <b>D-Sens</b> back to <b>zero</b> .
<b>R-Sense</b>	Release Sensitivity. Similar to <b>A-Sens</b> and <b>D-Sens</b> , but affects Release time.
<b>Env Time KF</b>	Envelope Time Keyboard Follow. Envelope times follow the MIDI note. Setting positive values here shortens <b>Attack</b> , <b>Decay</b> and <b>Release</b> (all at the same time) when you play higher notes, and lengthens them when you play lower notes. You will hear this effect when playing a piano.

## The Effect Section

A comprehensive, high-quality effects section is a must for any modern synthesizer, and the **V-Synth** offers you plenty of choice here. There are three separate blocks which appear as miniature rack units on the screen: **MFX** (Multi-Effects), **CHO** (Chorus or Flanging) and **REV** (Reverb or Delay). These blocks can be routed in parallel, series or any mixture of both.

The routing system may need a little explanation, although if you look carefully at the screen you can see that the signal flow is actually indicated by small arrows. Output from the **TVA** section is sent to all three blocks in parallel, each with a master send control. Immediately in front to the **MFX** is an **Output Assign** parameter **1** offering the following choice of values:



<b>MULTI</b>	Multi Effects. The standard setting where the signal is routed through the MFX block.
<b>MAIN</b>	Main Outputs. The signal that would otherwise go to the MFX is sent straight to the main outputs (MIX OUT) instead.
<b>DIR</b>	Direct. The signal that would otherwise go to the MFX is sent to the dry outputs (DIR OUT) instead.

To allow any parallel and/or serial mixture of all three effects, the **MFX** block has three output controls. The one to the right sets the amount of **MFX** signal sent straight to the **MAIN** outputs. Below the block are two more controls which can send a certain amount of the **MFX** signal to the **Chorus** and **Reverb** blocks - useful for routing the effects in series. Similarly, the Chorus block has a "To Rev" control **2** so that the processed signal can have reverb added to it.

If you have plenty of time right now, recall a patch with a lot of upper partials (e.g. **202: Tea Bea Lead**), touch the **Effects** pad and the **MFX** tab, then try out each and every **MFX** type in turn. Note that many of these effects have multiple pages of parameters. Although you might not learn many details at this sitting, at least you will have seen all the possibilities on the screen, not just in the list in the **Owner's manual**.

As well as the Send levels, up to three type-specific MFX parameters can be modulated from the Matrix, and this can be very useful if you would like to e.g. control the repeat rate of a delay via the **TimeTrip** or the degree of distortion via foot pedal. In general, you should always have the **Owner's manual** handy so you can see what these destinations are, because they simply appear as MFX1, MFX2 and MFX3 in the Matrix! See the chapter "**The Matrix - Assigning Destinations**" below.

## ▶ ▶ ▶ Advanced Sound Programming

### Sampling and Encoding

The **Owner's Manual** includes quite a readable section about how to sample your own sounds, almost as step-by-step instructions. Being primarily a reference work however, the Manual doesn't include many tips about e.g. when to use pre-effects, how to find the best loop or Event points, how to choose the most appropriate encoding method etc.

- \* *On the V-Synth, samples can only be saved on a per project basis. Therefore, individual samples cannot be saved one by one to their own files.*

### General

Try to make sure that maximum levels are as close as possible to **0** on the dB meter **1**, without ever lighting up the **Peak LEDs**. Use the **INPUT LEVEL** knob on the panel in preference to the **Pre-Gain** parameter. The trigger mode **LEVEL** is usually the best for sampling from external sources, but sampling doesn't stop automatically so please remember to touch the **STOP** pad.

The **PreTrigger** parameter adjusts the size of a special ring-buffer, a short piece of memory (up to 1 second in the **V-Synth**) to which the input is continuously being written before sampling "officially" starts. This is automatically tagged on to the beginning of the finished sample to ensure that you don't lose the first bit - especially useful when using **LEVEL** trigger mode. You can safely set **PreTrigger** to any value you like (though **50 ms** is usually enough if the **Trigger Level** can be set nice and low). Use the Truncate function afterwards to remove any excess samples at the beginning.



- \* *For the Digital IN/OUT of the V-Synth, possible sampling rates are 96 kHz, 48 kHz, and 44.1 kHz, and a bit rate of up to 24 bits is supported. As for the Digital Out, you can change the sampling frequency by means of Digital Output Freq in System Mode. The internal format of the sampling frequency of the V-Synth is fixed at 44.1 kHz.*

### Pre-Effects

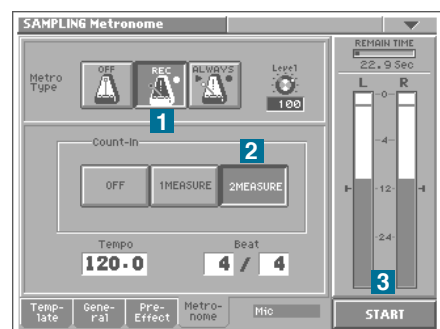
Instead of using an external compressor or limiter, audio can be recorded through the **V-Synth's** built-in dynamics processor. This is particularly useful for compressing live vocals or for changing the punch and/or ambience of a drum loop.

Tip: To remove ambience from a drum loop, use the Noise Suppressor (a soft gate) with maximum **Threshold** and minimum **Release**.



### Metronome

Having an in-built metronome is a great advantage whenever you need to sample some of your "live" playing (or singing) at a particular speed. Set the Tempo and Beat values first, then switch MetroType to **ALWAYS** and adjust the Level parameter until you feel comfortable with the volume. Change MetroType to **REC** **1**, select a **2MEASURE Count-In** **2** then touch **START** **3**. The **V-Synth** will only start recording after a two bar count, just like most sequencers.

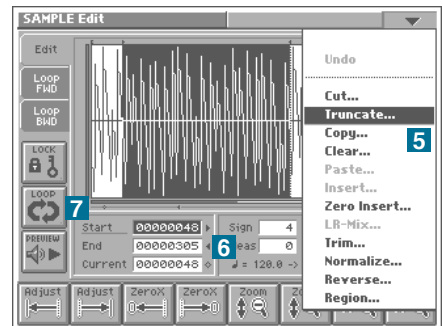
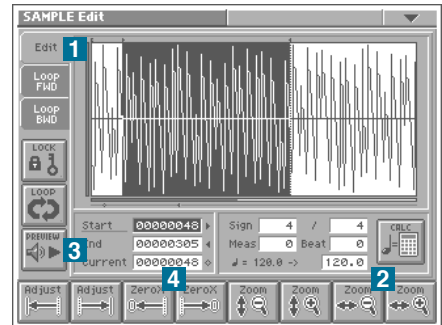


## Editing Samples - Truncating

The first thing you should do is cut off any excess samples (there is usually quite a lot at the end) using the Truncate function. The method explained below involves truncating twice (once for the beginning and once for the end), but it is safer than trying to do this all at once. After a little practice, this method will come naturally.

Touch the **Edit** pad **1** to enter the **SAMPLE Edit** page. Touch the horizontal **Zoom '+'** pad a few times until you can't see the start any more, then touch the horizontal **Zoom '-'** once **2**. Hold **SHIFT** and turn the **VALUE** dial until the highlighted section starts very close to the beginning of your sample. Touch horizontal **Zoom '+'** again and repeat the procedure until the highlighted area starts exactly at the beginning of the sample, where the wave crosses zero. Touch the **Preview** pad to make sure **3**. You can use the **ZeroX** (zero-crossing) buttons to find the exact start automatically **4**. Select the **Truncate** function from the **drop-down** menu **5**, read the message, then confirm.

Zoom out completely and press the **cursor-down** button to highlight the **End** value **6**. Touch **Preview** to check whether there are any unwanted bits at the end. If you have recorded something you wish to loop in its entirety (e.g. a drum loop), you should activate the **Loop** pad **7** to make sure that there isn't a "hiccup" at the end. Touch the **Preview** pad and use the **VALUE** dial until you can't hear any unwanted samples. Keep zooming in and adjusting the end point until you are satisfied. Use the **ZeroX** (zero-crossing) buttons. Note: If your sound "fades" to silence (e.g. a cymbal), you should also use vertical **Zoom '+'** to make sure you don't lose the last bit of the "tail". When you have finished, select the Truncate function again.



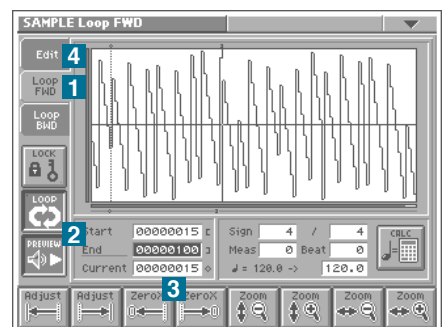
## Editing Samples - Finding the Best Loop Points

Depending upon the complexity of a sample e.g. whether it has vibrato or tremolo etc., finding good loop points can be difficult. I find the following method very useful:

First of all, search for a section of the wave where the volume remains fairly constant. Touch the **Loop FWD** (forward) tab **1** and set the **Start** and **End** points to include at least two of the "humps" which are caused by the cyclic effect. Touch the **Loop** and **Preview** pads **2** so they are both highlighted. Zoom in a little to make sure that the **Start** and **End** points are both at approximately the peak of each "hump". Keep alternating between **Start** and **End** with the **cursor** buttons, and touch the **ZeroX** buttons **3** until you hear no more clicks.

If you don't really need anything after the loop, you might be able to save a lot of memory (in the long run) by doing the following: Now write down the **Start** value on a piece of paper - this is important because the loop data will be lost when you truncate. Touch **Edit** **4** and move the **Start** point to the very beginning. Truncate, touch **Loop FWD** and set the **Start** point to the number closest to what you wrote down before. Zoom in as far as possible and adjust the **Start** point to be exactly what you wrote down.

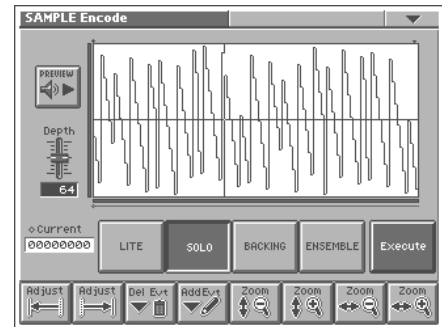
\* *The V-Synth's factory-loaded preset waves cannot be edited or encoded. Select a sample that you've sampled or imported.*



## Encoding

Depending upon the type of audio material in the sample, it must be processed according to one of four different encoding algorithms, each of which enables a different set of the **VariPhrase** features. You are given this choice because certain algorithms are better for certain jobs. Note: Encoding is non-destructive i.e. the original sample is not overwritten and can be re-encoded at any time (as long as you do not delete the original wave).

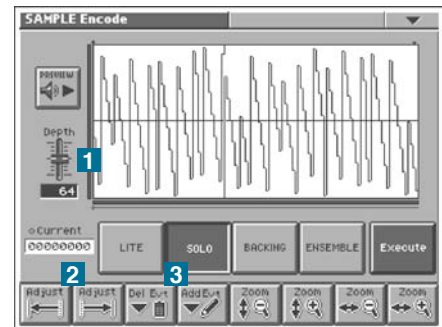
\* *The V-Synth's factory-loaded preset waves cannot be edited or encoded. Select a sample that you've sampled or imported.*



	LITE	SOLO	BACKING	ENSEMBLE
PROS	requires the least memory	all VariPhrase features are supported	most VP features supported, best at handling percussive material	most VP features supported, best at handling complex material
CONS	no Events, switching VariPhrase on causes artefacts	requires more memory	no Formant control, no Robot Voice	no Formant control, no Robot Voice
Typical usage	conventional sampling	vocals and solo instruments	drums and percussion (unpitched)	fully mixed audio, rich sounds such as choirs

## Defining Events

Before encoding, you can set the markers which define individual **Events**. Think of Events as snippets within a sample, e.g. the individual hits in a drum loop, the words in a vocal phrase - whatever you like. Individual Events can be played consecutively or on fixed keys (C, C#, B etc.) if you choose **STEP** or **EVENT** mode in the **OSC Type** page. Touch the **Encode** pad in the **SAMPLE TOP** page. The **V-Synth** operating system automatically analyses samples and inserts Event markers wherever it finds distinct "beats". The **Depth** parameter **1** controls how many of these will be found - try changing this value. Use the **Adjust** pads **2** to jump from one **Event** marker to the next, **preview** the current Event, and delete or add Events using the **Del Evt** and **Add Evt** pads **3**.



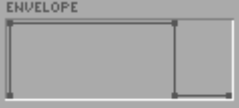
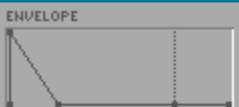
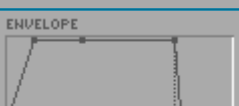
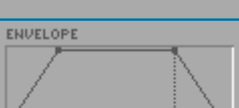
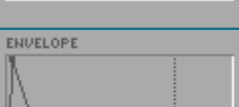
\* *When adding Events you should zoom in to the wave for fine control over position*

## Effective Use of Envelopes

You have already seen that many sub-sections in the **V-Synth** have their own dedicated envelopes. Here are a few tips to help you make the most of them:

### Typical Envelope Shapes

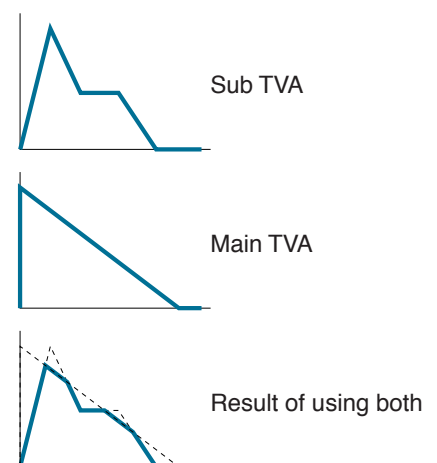
The **ADSR** envelope was originally developed to mimic the volume, pitch and tonal changes of notes played on existing acoustic and electromechanical instruments using only a few parameters. Here is a short list of a few real instruments and how to achieve similar results using an ADSR-type envelope:

Instruments	Envelope	Comments
Organ		immediate Attack, maximum Sustain, immediate Release
Piano		very short Attack, long Decay, zero Sustain, short Release
French Horn		medium Attack, maximum Sustain, fairly short Release
Musical Saw		long Attack, maximum Sustain, long Release
Bass Drum		very short Attack, medium Decay, zero Sustain, medium Release (preferably the same value as Decay)

\* Note that the Decay value is irrelevant when Sustain is maximum.

### Composite TVAs

With only four parameters, **ADSRs** were always a compromise. Although unable to simulate exactly how (for instance) a real piano note decays, most modern instruments still use **ADSR** envelopes because they are simple. The **V-Synth** has a solution to this problem: Each oscillator has its own dedicated **Sub-TVA**, and the signal is sent to a main **TVA** afterwards. This allows for more subtle shapes while retaining the quasi-standard four parameters (**ADSR**). Remember that many of the **PCM** waves already have a "built in" envelope, so this is yet another factor to be added to the equation!



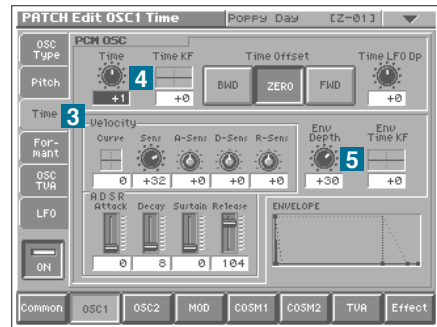
## Using the Time Envelope as Event Offset

When using **STEP** or **EVENT** Playback Modes you may find that some of the Events (i.e. the individual snippets) of the sample start too slowly or too quickly, or they have an unwanted bit at the beginning. Clever use of the **Time** envelope can solve any such problems:

Recall patch number **012:Poppy Day** and touch the **OSC1** pad **1**. Take a look at the OSC Type page - the **Playback Mode** is **Step** **2**, and that is why the Events are played in strict succession whatever notes you play. There are four Events in this patch: "Paw-Pee-Day-Daah".

Touch the **Time** tab **3**. Although the **Time** parameter is set to **-19** **4**, this is the same as selecting **ZERO Time Offset** with **Time** at +1 (I programmed this sound before the **Time** Offset pads were included). So **FWD** mode with **Time** = **-20** as well as **BWD** mode with **Time** = **+20** are the same as **ZERO** mode with **Time** = +0. Check this.

Important here are the **Env Depth**, **Decay** and **Sustain** values. In combination they cause the first part of each and every Event to be drastically shortened, so you can see this trick as a sort of **Start Offset** (see the **OSC Type** page) for individual Events. Try changing **Env Depth** to **+0** **5** to see how much difference this makes!



## Using the Time Envelope for Delayed "Freezing"

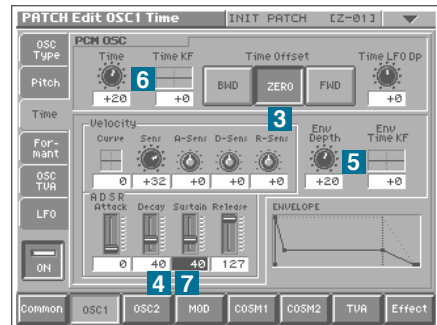
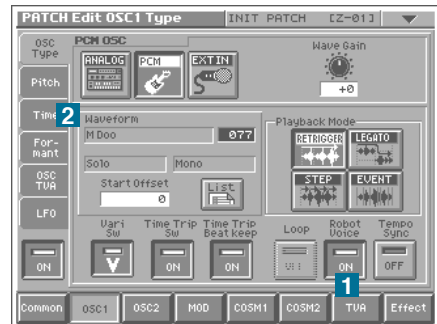
Especially in combination with the Start Offset parameter, a similar method can be used to isolate and freeze any part of a wave, but still include some attack at the beginning. You will find a prime example of this trick in the presets: In **147:GizmoVox**, the sound of oscillator 1 hardly resembles the original wave.

Recall **512:INIT PATCH**, set **OSC1 / Osc Type** to **PCM** and select Waveform **077 "M Doo"**. Touch the Pitch tab and listen to the sound. The pitch rises at the beginning, then loops through a section of natural vibrato. Note that the Loop button is not available - this is because a loop has been defined within the sample.

Our hypothetical goal (for learning purposes only) is to manipulate this sound so that it starts with the initial attack, then freezes in the middle of the "oo" bit, all at the same pitch and with no vibrato/tremolo whatsoever..

Touch the **Robot Voice** pad **1** to flatten the pitch, then touch the **Time** tab **2** and select **ZERO** **3**. Trying out all positive values for the **Time** parameter shows that they either slow the beginning down too much, or else they make the tremolo too obvious. Changing **Start Offset** (in the **OSC Type** page) doesn't help either, because the entire wave is still "frozen". Here's the simple solution:

Leave **Time** at +0, flip **Sustain** down to **0** and set **Decay** to **40** **4**. You will still only hear the frozen beginning of the wave. Now take **Env Depth** up to around **+20** **5**. What is happening here is that the envelope effectively shifts the **Time** parameter up to **+20** **6**, then quickly takes it back to zero before the tremolo starts - so the wave is frozen at this (later) position. To add some movement back into the sound, take **Sustain** up. Around **40** is nice and subtle **7**.

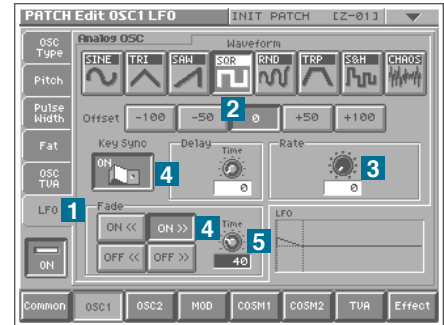


## One-Shot LFO as Additional Envelope

If LFOs are otherwise not required (e.g. for pitch or formant modulation), they can be put to good use as additional envelopes. Although there is no special one-shot LFO mode in the **V-Synth**, this can be simulated using the following trick. Again, this is only an experiment to show how it works - the sound itself is not particularly useful!

### Dive

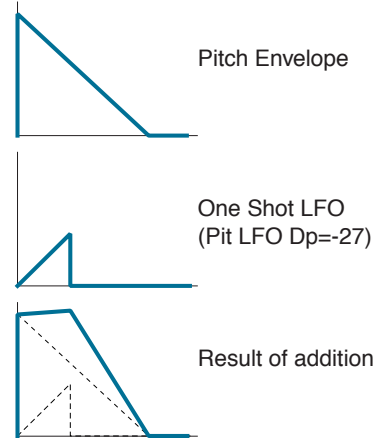
Start with **512:INIT PATCH** and go to **OSC1**. Touch the **LFO** tab **1**, select **SQR** **2** and take **Rate** down to **zero** **3**. Activate both **Key Sync** and the "ON>>" Fade button **4**. Change the **Time** value to **40** **5**. You should now see a short downward sloping ramp in the LFO graphic display - this is our extra envelope.



To demonstrate how this could be used to "modify" an envelope, select **OSC1 / Pitch** **1**, flip **Sustain** down to **zero** and change **Decay** to **64** **2**. Take **Env Depth** up to **+40** so that the pitch drops at a medium rate **3**. Play a note and listen to the shape of the decay - it appears to be linear. Now change **Pit LFO Dp** (Pitch LFO Depth) to **-27** and play a note **4**. At **-27**, the rising LFO (it was falling, but the modulation depth is negative) cancels out the first part of the envelope exactly, and you end up with a plateau as long as the LFO **Time** parameter, followed by the rest of the "dive" caused by the envelope.



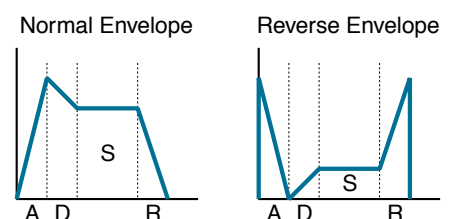
Of course you can make the one-shot LFO have the opposite effect, e.g. adding it to the normal filter envelope for an additional short "pluck" at the beginning of each note.



## Inverse Envelopes

Not many people ever consider putting envelopes upside-down, although this can be very useful sometimes. The individual segments change their meanings completely:

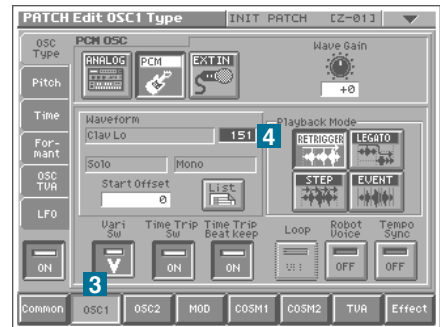
<b>A</b>	becomes a decay to minimum after an instantaneous attack
<b>D</b>	becomes a rising slope if the S value is not 127 (minimum!)
<b>S</b>	is inverted i.e. maximum becomes minimum and vice-versa
<b>R</b>	becomes a final rising slope



Next

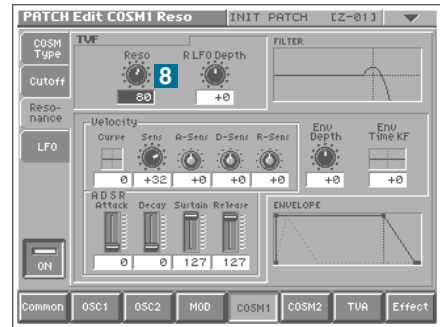
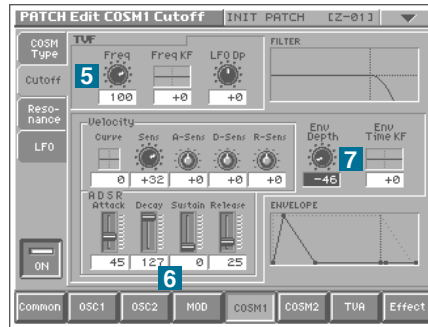
## Release Click

Start with **512:INIT PATCH** and go straight to the **TVA** section **1**. Change **Release** time to **33** **2** (you will find out why very shortly). Now go to the **OSC1 / OSC Type** page **3**. Set **PCM-type** and select wave **151 "Clav Lo"** **4**.



Touch the **COSM1** pad, select **TVF** and touch the **Cutoff** tab. Take **Freq** down to **100** **5** and set the envelope parameters as follows: **A** = 45, **D** = 127, **S** = 0, **R** = 25 **6** (shorter than in the main **TVA**) and **Env Depth** = -46 **7**.

To accentuate the effect, touch the **Resonance** tab and take **Reso** up to about **80** **8**. Go back to the **Cutoff** page and play the keyboard.



OK, this sound is not particularly spectacular at this primitive stage, but it demonstrates the only way (in most synthesizers) of getting a noticeable and rapid change in timbre when you release notes - setting a negative envelope depth.

## Getting More out of a Sample

One of the major selling-points of the **V-Synth** is its **VariPhrase features**, so you are surely aware of all that VariPhrase has to offer. However, you may not realize all the implications this has in terms of flexibility i.e. just how far you can go with a "raw" waveform.

Patch **206:FragileVoice** is a good case in point. To find out how this sound was made, touch **OSC1** and check which Waveform was used to create something like a cross between a voice and an ethnic violin: "**Power-B fast**" is actually a nasal organ-type sample with a fast rotary effect. Let's find out how simple it see the potential of waveforms. Instead of defeating all the parameters in turn, go to **512:INIT PATCH** and set **OSC1 / OSC Type / PCM / Waveform** to **168 "Power-B fast"**. Now turn the **Time** knob down...

## ▶▶▶ Advanced Performance

### The Arpeggiator

The **V-Synth's** arpeggiator goes way beyond what you would normally expect an arpeggiator to be able to do because, as well as handling the usual up/down arpeggio functions, it is also a quite a comprehensive pattern sequencer. If you haven't done so already, please read the section in the **Owner's Manual**.

- \* *Arpeggiator settings can be saved with each patch as part of the patch settings. An arpeggio pattern can be saved for an individual patch as part of the patch settings. This means that you can create a patch designed specifically for that arpeggio pattern (or vice versa).*



### Stage 1 - Normal Arpeggios

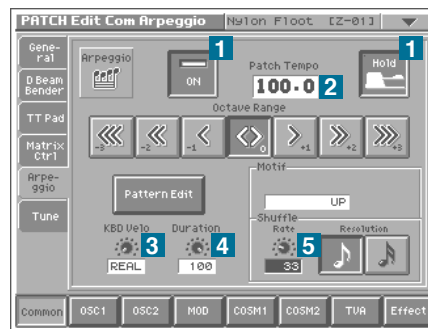
**Motif: UP, DOWN, UP&DOWN, RANDOM, NOTE-ORDER**

A few little experiments with the main arpeggiator parameters - more "learning by doing", and lots of fun! Later on you will learn step and realtime recording, as well as how to handle controller data.

Go to **024:Nylon Float** (which is suitably dynamic for our purposes) and play the keyboard for a while to get used to the sound. Touch the **Common** pad and switch on the **arpeggiator** as well as the **Hold** function **1**. Take the **Patch Tempo** down to **100** (use the **TEMPO** knob if you like) **2**. Play the D# below middle C and hold it. Add higher black notes with wildly differing velocities (some soft, some hard), then release the first note. Repeat this a few times until you come up with an arpeggio you really like. Experiment with the **Motif** value and different **Octave Ranges**.

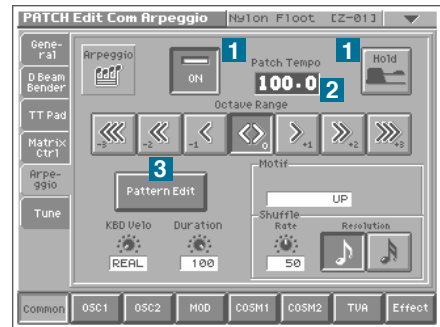
Because the **KBD Velo** parameter says **REAL** **3**, each note will appear with its original velocity. Play around with this parameter to see what it does, then set it back to **REAL**. Now try the **Duration** parameter **4**. When you're finished, set it somewhere below 50 percent for shorter notes. Try some **shuffle** **5** - **33** and **66** are full shuffle, the extreme values (**0** or **100**) even play two notes at the same time. You might also like to try setting the **Resolution** to a semiquaver - you can get some very interesting double-time effects at **Shuffle Rates** of **33** or **66**!

Try playing the **TimeTrip** and turning **C1/C2**. If you have connected an external sequencer, you can record your performance because arpeggio notes are sent to the MIDI output. Note that if you play the keyboard now, your original arpeggio will be replaced by the new notes.

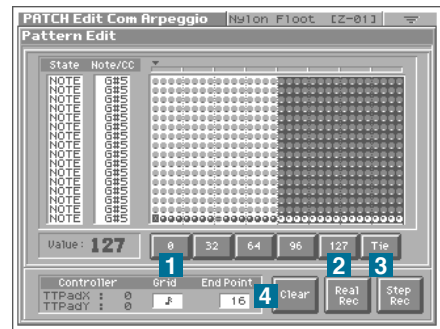


## Stage 2 - Custom Rhythms

Reset **024:Nylon Floot** by going back to **PATCH PLAY** mode (press **EXIT**) and stepping down and up a number (**DEC/-** and **INC/+** buttons). Touch the **Common** pad and switch on the **arpeggiator** - but don't press **HOLD** yet **1**. Change the **Tempo** to **100** **2** and play a middle C. You will hear it repeated monotonously with the same velocity as it was played. Touch the **Pattern Edit** pad **3**.

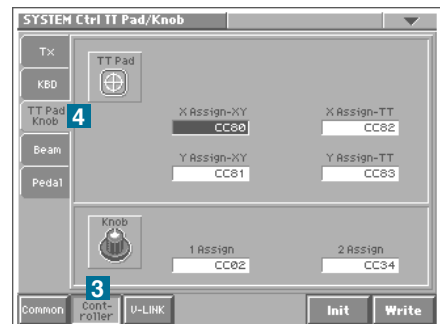
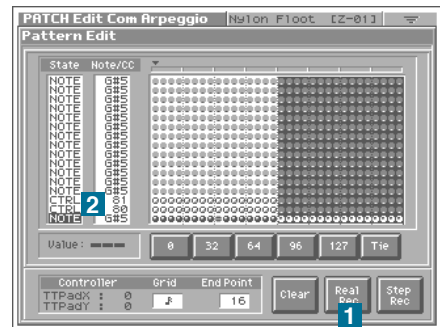


The bottom row is already filled with 32 semiquavers by default - this is the rhythm you hear when you play the keyboard. Use the **cursor** buttons to highlight the 9th note along and press the leftmost pad, "**0**" **1**. Press the **cursor-left** button a few times to move back to the first note in the row. You can see that the 9th note is now missing, and if you play the keyboard you can also hear the gap. Press the **127** pad and listen again **2**. The first note is now played with a higher velocity than the others (which are all at 100 - check this by pressing the cursor-right button a few times). Move the **cursor** to where you deleted the note and press "**Tie**" **3**. The space has now been filled in with a "=", effectively making the previous note at least a quaver longer.



32 notes are too many for our purposes here, so change the **End Point** to **16** **4**. You might find it easier to use the **cursor-down** button to reach this field. Also, the pattern still reacts to how hard you play keys. Press **EXIT**, change **KBD Velo** to **120**, then touch **Pattern Edit** again.

How about recording some realtime controls? Touch the **Real Rec** pad **1**. You will hear G#5 repeated with the rhythm you have already set up. Play with the **TimeTrip** (only!) until you are satisfied with the results, then touch **Stop**. Two extra lines have appeared containing the data you have just recorded **2**. The **CC numbers** (**80** and **81** by default) are the default MIDI controls assigned to the TimeTrip. Press the **MODE** button, select **SYSTEM**, touch **Controller** **3** and then the **TT Pad Knob** tab **4** to check these values. There are plenty of other interesting parameters in the **SYSTEM** pages - have a look around, but don't change any values yet! Read the **Owner's Manual** until you are sure you know what each parameter means.



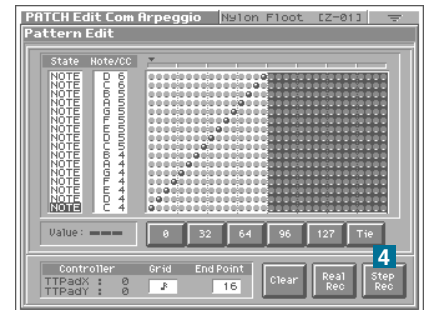
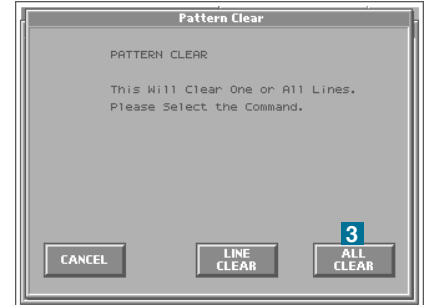
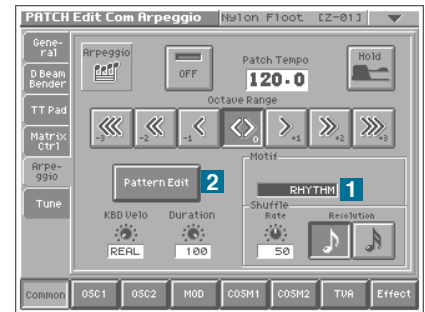
## Stage 3 - Custom Sequences

### Motif: RHYTHM, PHRASE, AUTO

Go back to the main arpeggiator page and set **Motif** to **RHYTHM 1** so that the NOTE values become relevant. Touch **Pattern Edit 2**. Highlight anything in the bottom row and touch **Clear**. Select **ALL CLEAR 3** to delete all the lines in the grid, then touch **Step Rec** (step recording) **4**. Now enter notes or chords (playing legato will also result in chords) until you have filled all 16 steps, and touch **Stop**. To change the velocity of any of these notes, simply use the **cursor** buttons to highlight them, then change the value using the row of **pads** and/or the **VALUE** dial. Setting zero will delete a note.

Now play any note - you should be able to hear the sequence you have just made, but in the original pitch only. Press the **EXIT** button and change the **Motif** to **PHRASE** so that you can transpose the sequence by playing different notes.

Touch **Pattern Edit**, then **Clear**. Select **ALL CLEAR**, then change the **End Point** to **32**. Touch **Real Rec** (realtime record). Wait for two bars, then play for two bars. Touch **Stop** when you are ready. If you don't like what you have entered, you can always use the **Clear** pad to start again. Tip: don't play too laid-back, otherwise several notes will appear later in the grid. Having said that, such "mistakes" can turn out to be quite funky and highly inspiring!



## Performance Controls

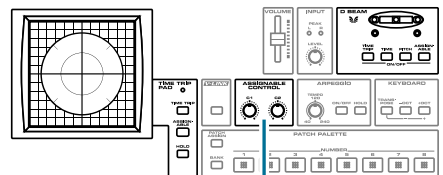
A lot of thought has gone into making the **V-Synth** one of the most truly "playable" keyboards on the market. The left hand controls (**TimeTrip**, **D Beam**, the **C1** and **C2** knobs) are specifically designed for manipulating sounds in realtime once they have been programmed.

Of course any of the buttons, knobs and sliders on the panel could be used as performance controls, and you might like to change e.g. the **Decay** time in an arpeggio or to switch effects in and out during live performance. However, it is a much better idea to assign one or more of the many multi-purpose controls to the appropriate destination in the Matrix Control (see below).

Why? Because all the left hand controls are assigned MIDI CC numbers (definable in the **MODE / SYSTEM** settings). Any movements can be recorded to a MIDI sequencer or even to the **V-Synth's** own pattern sequencer (where all recorded data is quantized to the current Grid value). The other buttons, knobs and sliders don't send data to the MIDI Out port.

TimeTrip Pad

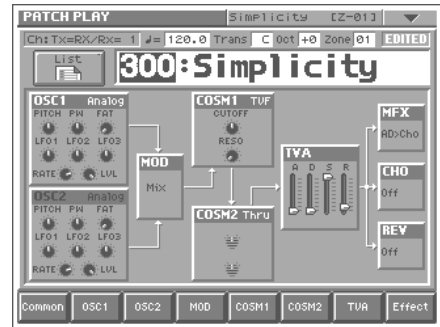
Twin D Beam



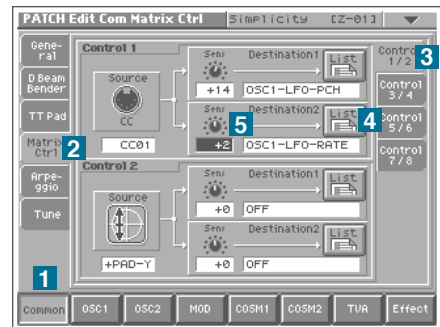
Assignable Control

## The Matrix - Assigning Destinations

The **V-Synth's** Matrix Control is used for routing any sources of MIDI data to a wide range of possible destinations. Available sources include the **V-Synth's** left-hand controls, all standard MIDI continuous controllers (including Pitchbend and Modulation) as well as Aftertouch, Velocity and Key Follow.

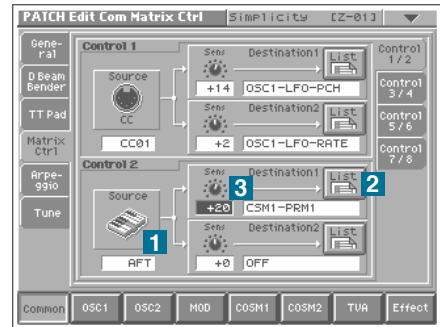


Let's add a bit more depth to the "Simplicity" patch you made early on in this tutorial - it should be number **300**. Touch **Common** **1**, select the **Matrix Ctrl** tab **2** and the **Control 1/2** tab if necessary **3**. Pushing the Bender (CC01) has already been used for adding vibrato, but here is a little trick which can always be used to make this more expressive: Touch the **Control 1 / Destination 2 List** pad **4** and select **018:OSC1-LFO-RATE**. Touch **OK** and set the sensitivity (Sens) to **+2** **5**. Pushing the Bender now increases the vibrato rate as well as its depth.

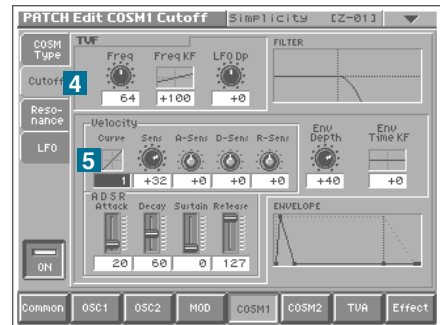


Highlight the source of **Control 2** (at the moment this reads **+PAD-Y**) and change it to **AFT** (aftertouch) by pressing the **DEC/-** button twice **1**.

Select **044:CSM1-PRM1** (COSM1-Parameter1) from the upper list **2** and change the corresponding sensitivity to **+20** **3**. Pressing harder on the keyboard now opens the filter a little.



To make filter **Cutoff** velocity sensitive, you don't really need to use the Matrix: Simply go to **COSM1 / Cutoff** page **4** and change the **Velocity Curve** to **1** **5**.



Activate oscillator 2, touch the **OSC2** pad and the **Pitch** tab **1**. Change **Fine** to **+5** **2** so that the oscillators slowly “beat” against each other. With two oscillators the sound is now much thicker, but pushing the Bender only adds vibrato to oscillator 1 at the moment. Go back to the **Common / Matrix Ctrl** page and select the **Control 3/4** tab **3**. Set the same values in Control 3 as in Control 1, but for oscillator 2 instead:

**Source = CC01**

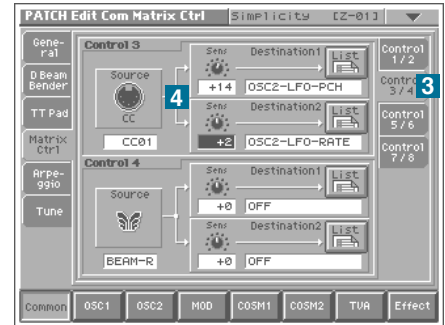
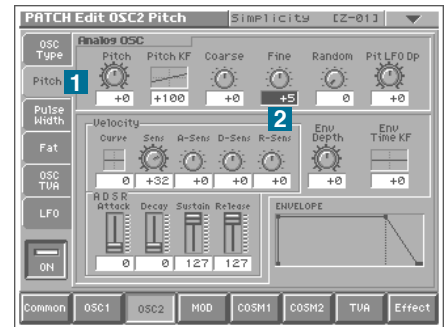
**Destination1 = 040:OSC2-LFO-PCH**

**Sens = +14**

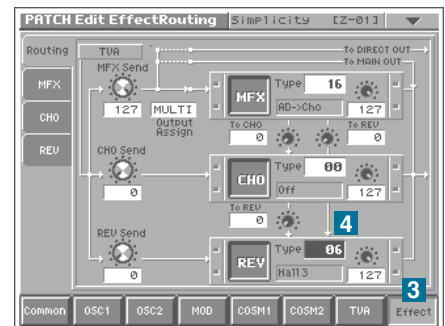
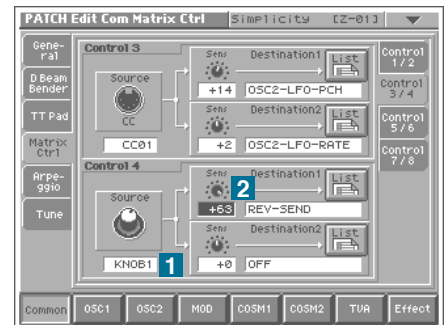
**Destination2 = 39:OSC2-LFO-RATE**

**Sens = +2**

Play the keyboard and push the Bender. You should be able to hear that the LFOs in both oscillators have the same rate, but also that they are not synchronized - one can start later (in it’s cycle) than the other. To remedy this, go to each of the oscillator LFO pages in turn and switch on **Key Sync**.



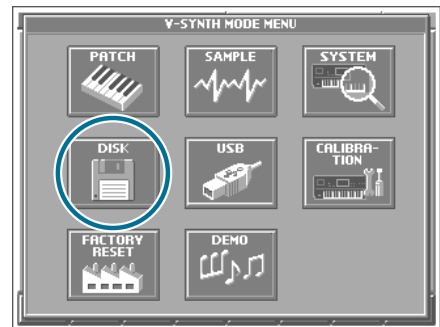
Now let’s create a control for the amount of Reverb. Select **KNOB1** as **Control 4** source **1**, set **Destination1** to **075:REV-SEND** **2** and **sensitivity** to **+63**. Even if you turn up the **C1** knob now, you won’t hear any reverb because it hasn’t been switched on yet. Touch the **Effect** pad **3** (and the Routing tab if necessary) then set **Reverb Type** to **06 (Hall3)** **4**. Save your refined version of “Simplicity”!



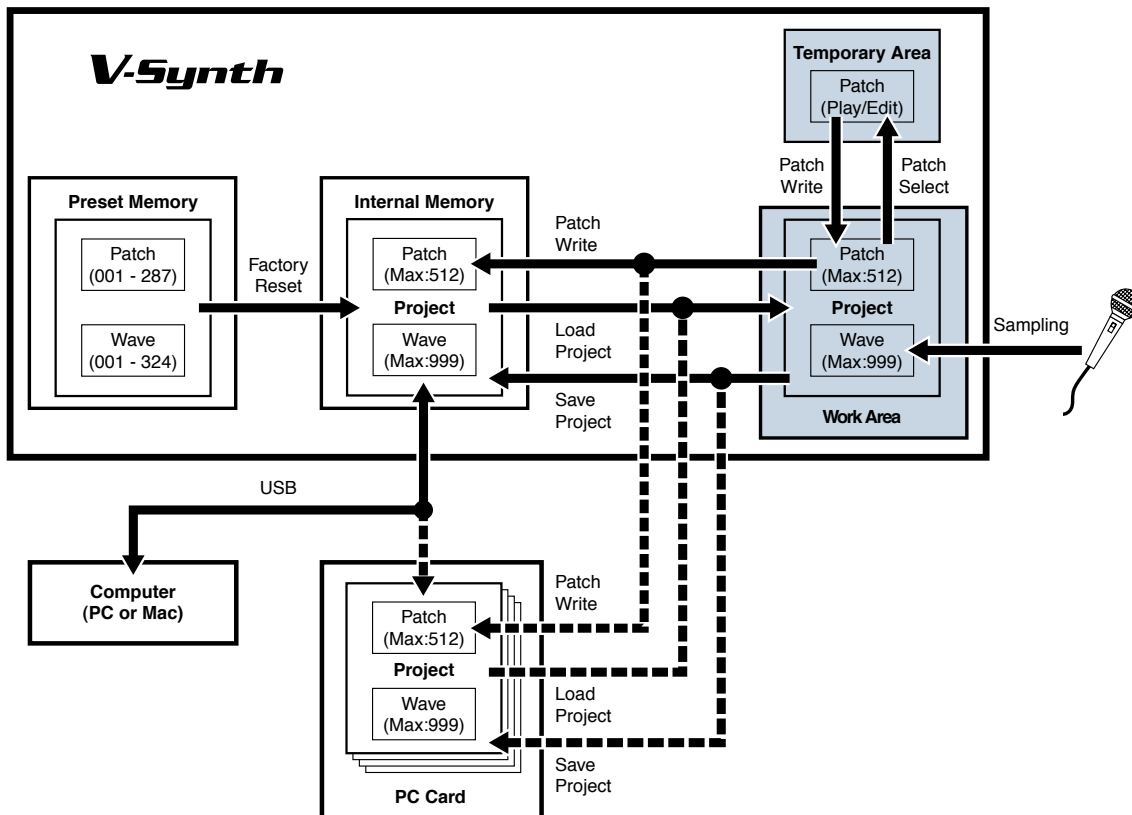
## ▶▶▶ Backing Up your Data

Now that you have started making your own sounds on the **V-Synth**, it's time you thought about making back-up copies. To be able to transfer entire projects, patches and samples (in WAV, AIFF or the **V-Synth's** proprietary W00 format) between your **V-Synth** and computer, the USB drivers must be installed in your computer. When the USB connection is established, the driver installation will begin automatically. Apple Macintosh (OS 9.04 or later, OSX) as well as Microsoft Windows (Me, 2000 and XP) are supported at present.

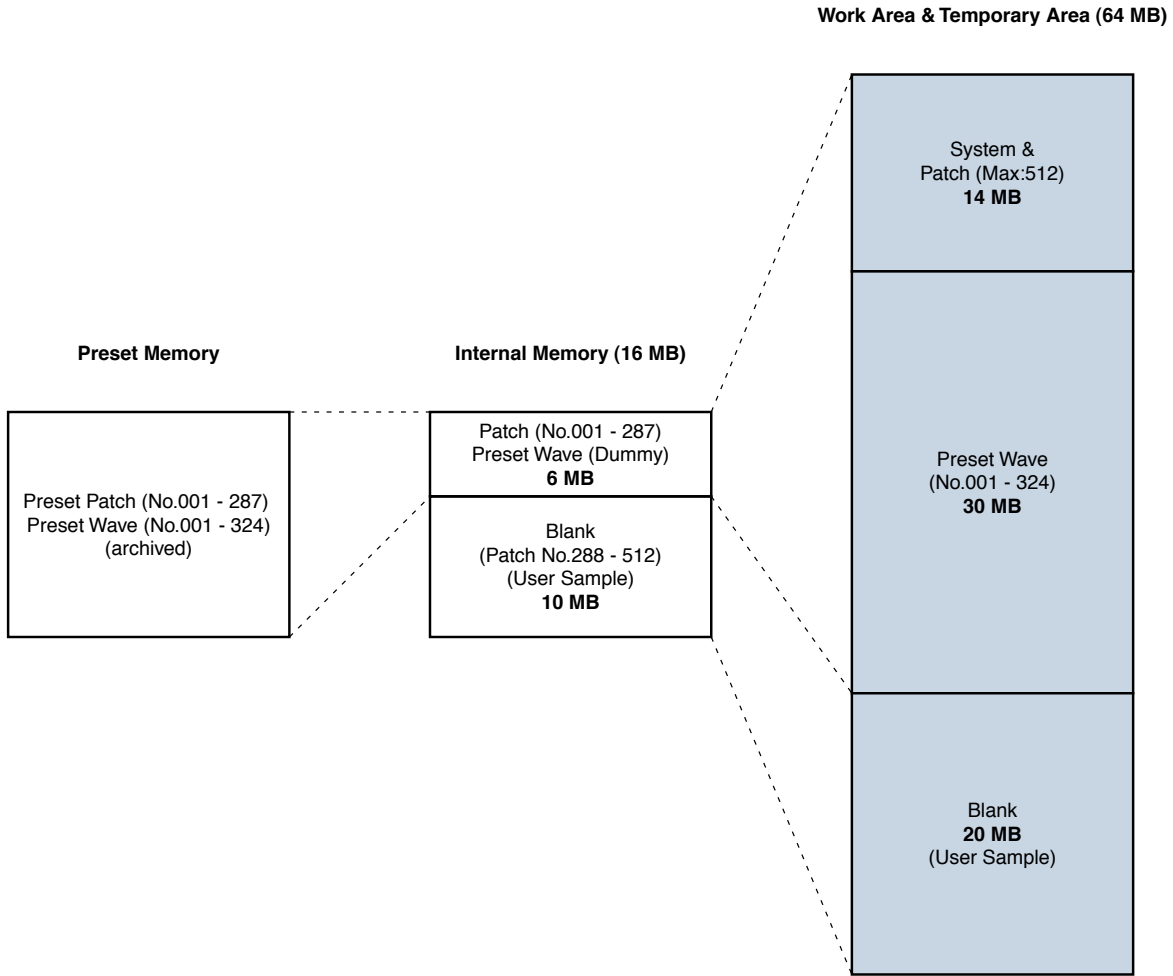
For general information about USB-related procedures, please refer to "**Settings Common to All Modes**" and "**Connecting to your Computer via USB**" in the **Owner's Manual**. To learn how to back up and restore data, please read the chapter "**Disk-Related Functions (Disk Mode)**".



\* The memory composition inside the V-Synth is as follows.



\* Each capacity of the memory is as follows.



- will be lost if you simply turn the power off.
- will not be lost even if you simply turn the power off.



## New dimensions in visual performance – V-LINK –

The V-Synth lets you use the pitch bend / modulation lever, TimeTrip Pad, D Beam controller, and C1/C2 knobs to control a connected external video device. This capability is called **V-LINK** ( **V-LINK** ). Your performance on the V-Synth can control not only sound, but images as well, linking the video to the sound of your playing.

*\* V-LINK is a feature that lets you perform using music and images. V-LINK makes it easy to enjoy a variety of video effects that are linked to your V-Synth performance gestures.*



### Linking sound and images (V-LINK)

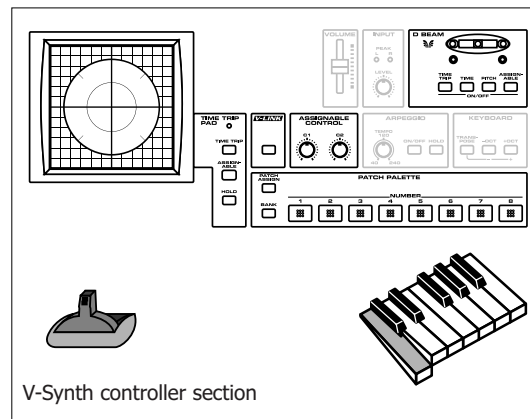
Let's experience V-LINK by using the Edirol **DV-7PR** Realtime Video Presenter in conjunction with the V-Synth. Using the V-LINK feature requires the following.

DV-7PR: System software Ver.2.0 or later

V-Synth: System software Ver.1.13 or later

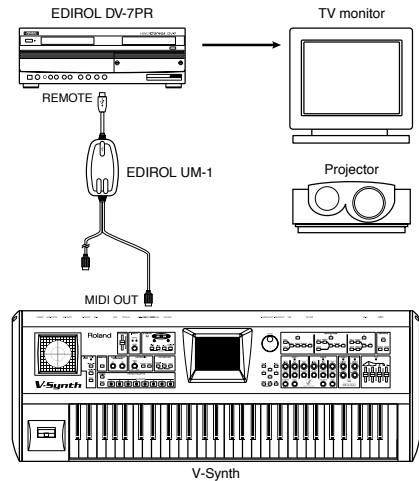
V-LINK is supported by the V-Synth controllers shown in the diagram

- Patch palette (p.44)
- Bender/modulation lever (p.44)
- Assignable controller C1/C2 (p.44)
- TimeTrip Pad (p.45)
- D Beam controller (p.45)
- Channel aftertouch

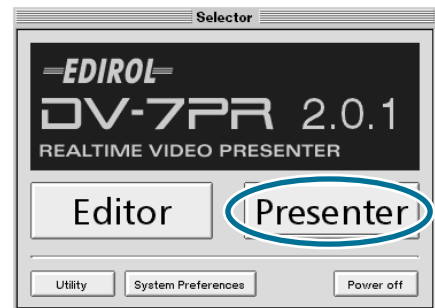


## Preparing to use V-LINK

1. Connect the V-Synth and DV-7PR, and turn on the power of both devices. Wait until both devices have started up normally.



2. Use the DV-7PR's **selector** to select **Presenter**.  
The Editor contains the DV-7R editing functions for use on video data imported from external video devices. For information of using the DV-7PR, refer to the DV-7PR instruction manual.



3. On the V-Synth, press **[V-LINK]**.  
The button lights, and the V-Synth's display shows the **V-LINK screen**. This is the basic screen for using V-LINK. Also notice that the **V-LINK** logo appears in the upper left of the DV-7PR's screen.



4. On the V-Synth's display, touch **<V-LINK>**. Make the following settings in the screen that appears.

	<b>MIDI Channel</b>	Specify the MIDI channel to be used for V-LINK messages. For this example, select <b>16</b> .
	<b>Audio</b>	Turn this <b>ON</b> if you want the DV-7PR to output audio as well, or <b>OFF</b> if you don't want it to output audio. Normally, you will be using only the sound from the V-Synth, so turn this <b>OFF</b> .
	<b>Output</b>	Turn this <b>ON</b> if you want to output images only when playing the keyboard, or <b>OFF</b> if you want images to be output all the time. For this example, turn this <b>OFF</b> .
	<b>Palette LocalSw</b>	Turn this <b>ON</b> if you want to use the V-Synth's <b>PATCH PALETTE [1] — [8]</b> to switch V-Synth patches, or <b>OFF</b> if you want to use these buttons only to switch images. For this example, turn this <b>OFF</b> .



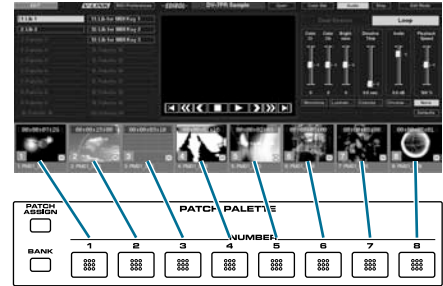
5. Let's save the settings we have made so far. In the lower right of the V-Synth's display, touch **<Write>** and then touch **<EXECUTE>**.
6. Press **[EXIT]** to return to the V-LINK screen. Preparations are now complete.

## Using the V-Synth to control sound and images

### Selecting clips (Patch Palette)

Simply turning **[V-LINK]** on will not cause a clip (image) to appear on your TV monitor — you must select a clip to be displayed. Let's do this. Of the thirty-two clips belonging to each palette in the DV-7R, you can select eight clips from the V-Synth. **PATCH PALETTE [1]–[8]** on the V-Synth correspond to Clips 1~8 in the upper line of the DV-7PR palette.

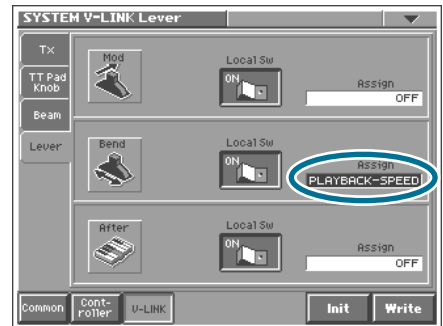
To prepare to switch palettes on the DV-7PR, hold down **[BANK]** and press **[1]** or **[2]** — at this point, the palette has not yet switched. When you next press one of the **PATCH PALETTE [1]–[8]** buttons, the palette and clip switch simultaneously.



### Changing the image playback speed (Bender lever)

From the V-LINK screen, touch **<Bender/Mod>**. **Bend** is assigned to the control of the **PLAYBACK-SPEED**, so moving the bender lever toward the right speeds up the image playback. Moving the lever to the left slows down playback.

Press **[EXIT]**, and then operate the bender lever as you play the keyboard. Notice that the sound (pitch) of the patch changes together with the image. The V-Synth patch **006:Heavy Drone** is a good patch to use for this purpose.

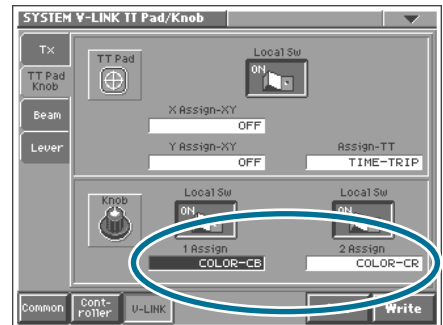


### Changing the color of the image (C1/C2 knobs)

From the V-LINK screen, touch **<Knob1/2>**. **Knob1** is assigned to **COLOR-CB** (chrominance: blue). Similarly, **Knob2** is assigned to **COLOR-CR** (chrominance: red). Turning **[C1]** changes the blue component of the image, and turning **[C2]** changes the red component of the image.

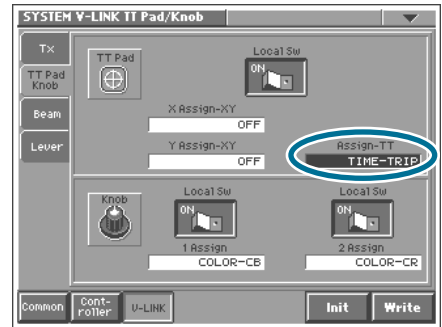
Press **[EXIT]**. Next, turn **[C1]** or **[C2]** as you play the keyboard. The way in which the sound changes (e.g., pitch, formant) depends on the currently selected patch. The **009:Phrase Lab** V-Synth patch works well here.

To return to the normal color balance, set **[C1]** and **[C2]** to the straight-up (center) position.



## TimeTrip the image (TimeTrip Pad)

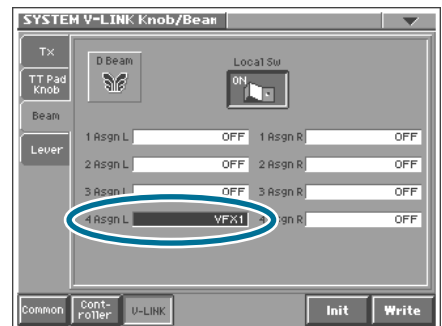
Press **[TIMETRIP]** located beside the V-Synth's **TimeTrip Pad**. Place your finger on the **TimeTrip Pad** and move it clockwise in a circle to make the image play in the forward direction. Move your finger counter-clockwise to make the image play backward. When you stop moving your finger, the image also stops at that point. Try touching the TimeTrip Pad as you play the keyboard. The V-Synth patch **023:TimeTripRun** is well-suited for this use.



## Apply a visual effect (D Beam Controller)

The DV-7PR provides visual effects such as **monotone**, **chroma-nega**, **colorize**, and **luminance-nega**. Let's use the V-Synth's D Beam Controller to apply these visual effects.

From the V-LINK screen, touch **<D BEAM>**. Here we will specify the V-LINK function to be assigned to the D Beam. You can select one of four V-LINK functions by pressing one of the buttons (**[TIMETRIP]** **[TIME]** **[PITCH]** **[ASSIGNABLE]**) located below the **D Beam Controller**. The screen settings correspond as follows.



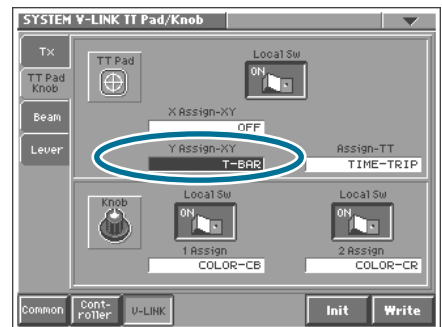
Button	TIME TRIP	TIME	PITCH	ASSIGNABLE
Left D Beam function	1 Asgn L	2 Asgn L	3 Asgn L	4 Asgn L
Right D Beam function	1 Asgn R	2 Asgn R	3 Asgn R	4 Asgn R

For this example, we'll set up the D Beam so that a visual effect is also applied when **[ASSIGNABLE]** is pressed. Touch **<4 Asgn L>**, and set **[VALUE]** to **VFX1**. Press **[EXIT]**, and then play the keyboard as you move your hand over the D Beam Controller (left side). We recommend selecting **020:LetThemPray** as the V-Synth patch.

## Wiping between two images (TimeTrip Pad)

From the V-LINK screen, touch **<TT Pad>**. **Y-Assign-XY** is assigned to **T-BAR**. With this setting, touching the **TimeTrip Pad** and moving your finger upward and downward produces an effect similar to operating the T-bar. Let's try switching between two clips as they play back together.

Press **[EXIT]** to return to the V-LINK screen, and press the V-Synth's **[ASSIGNABLE]** button located beside the **TimeTrip Pad**. Next, press **[HOLD]**. While playing the keyboard, touch the lower part of the **TimeTrip Pad** and select the clips you want to switch using **PATCH PALETTE [1]—[8]**. Slowly raise and lower your finger to switch images as the sound changes. Try **044:Rader Arp** as your V-Synth sound. You can select a clip to be switched each time you press **PATCH PALETTE [1]—[8]**.



## V-LINK functions that can be controlled from the V-Synth

The V-Synth lets you assign the following functions to controllers such as the TimeTrip Pad, D Beam Controller, and C1/C2 knobs in order to control V-LINK compatible video equipment (e.g., DV-7PR, V-4).

V-LINK function	MIDI message transmitted	DV-7PR	V-4
Playback Speed	CC10 (panpot)	YES	NO
Dissolve Time (image switching time)	CC5 (portamento time)	YES	YES
Audio Level	CC7 (volume)	YES	NO
Color Cb (chrominance)	CC72 (release)	YES	NO
Color Cr (chrominance)	CC71 (resonance)	YES	NO
Brightness	CC74 (cutoff)	YES	NO
VFX1 (Visual effect 1)	CC1 (modulation)	YES	YES
VFX2 (Visual effect 2)	CC91 (reverb)	NO	YES
VFX3 (Visual effect 3)	CC94 (celeste)	NO	YES
VFX4 (Visual effect 4)	CC95 (phaser)	NO	YES
Output Fade	CC73 (attack)	YES	YES
T Bar	CC11 (expression)	YES	YES
Dual Stream	CC64 (hold 1)	YES	NO
TimeTrip	CC92 (tremolo), CC93 (chorus)	YES	NO
Palette1 — 8 (Palette switching, Input select)	CC0 (bank select): 00H — 07H	YES	YES
Clip1 — 8 (Clip switching, Input select)	Program change: 00H — 07H	YES	YES

# V-Synth

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# A p p e n d i c e s

## ▶ ▶ ▶ Sound Designers' Comment

**Designer: Howard Scarr**

### The Potential of Waveforms

As already mentioned in "Getting More out of a Sample", VariPhrase-encoded samples are not only capable of covering a much wider range of musical notes than conventional samples,

but they are also very useful for creative sound design when more extreme parameter values are used...

### 001:Mad Orchestra – A Question of Time

The story of this patch is interesting because it is so typical of the surprises that VariPhrase technology has in store. They are only revealed if you are willing to experiment.

*\* Simply adjusting the oscillator parameter settings Pitch and Time often yields results which are very different from the original waveform*

There was no preconceived idea behind this patch – I certainly wasn't thinking anything on the lines of "let's turn this piano arpeggio sound into something which sounds more like an entire orchestra playing avant-garde music". My only thought was "what is the sonic potential of this particular wave?" and I answered that question at the twist of a knob – **TIME!**

### 012:Poppy Day – Similar Events

This one is based on the wave **066 - 137 Scat 2+**, a waveform which appears (in different guises) in several other presets, notably **007:VoixBulgares**, **084:Tetapaali** and **138:Sponge**.

Poppy Day is a good showcase for Step mode. The individual Events appear sequentially when you play notes, but because all four events are fairly similar you can still play normal solos. Try to remember this factor when recording your own samples!

### 203:Scratch Lead – Slow Movement

A scratchy ethnic violin sound from a brass waveform? Again, this wasn't thought out beforehand, it only arose via experimentation with the Time value i.e. "let's see what effect this parameter has on this waveform". **206:FragileVoice** is similar in that the rapid

modulation in the original waveform (caused by the Rotary effect) creates subtle, organic movement in the slowed-down version.

## Designer: Stephane Pigeon

### 008:Voco Bass

V-Synth analog oscillators may be considered as the Sound designer's "Swiss Army Knife".

By offering sine, square and triangular waveforms, these oscillators instantly provide the characteristic sound of the "traditional" synthesizer back at the time where everything was analog. These oscillators are best described as primitive and static, but very powerful: the basic sound they offer literally jumps straight onto listener's face! By slowing the time down to zero, VariPhrase is able to turn any PCM sample into a static sound whose potential power is comparable to the one offered by those analog waveforms. Start from an initialized patch, choose a PCM oscillator, enable both VariPhrase and Robot functions then make sure Time Offset parameter is set to Zero: the Frozen World then welcomes you!

Voco Bass has been designed while experimenting such static waves and browsing through various "frozen" PCM samples. This patch makes use of the "Make A Groove" waveform, frozen

right behind waveform's start point. To preview the resulting sound, from the Front Panel, switch all effects off, mute OSC2, disable COSM1 and hit a key. The static waveform you now hear quickly becomes annoying if left as it is. The programmer brought this patch into life by assigning the Formant parameter to the keyboard velocity (see **OSC1/Formant** page). Furthermore, bright hi-frequency sonic components were filtered out by using a Dynamic time variant filter (please now enable **COSM1**) and a sub-oscillator has been added by means of our Swiss Army Knife emulating a sine waveform (now enable **OSC2**). This sub adds an extra-bass character to the sound. At last, effects have been used to polish the patch and give its final shape thanks to the Analog Phasing effect (now enable **AFX** and **Chorus**)

Additional playability is offered by means of the TimeTrip pad (the X/Y mode alters both formant and filter **COSM1** cutoff frequency) and Aftertouch (increases **COSM1** cutoff frequency).

### 018:Pulsatronic

Pulsatronic perfectly illustrates different key-features inside a single powerful patch. First, the arpeggiator, which here turns a simple key-stroke into a rich up-and-down pattern. Settings can be customized from the **Common/Arpeggio** page where one may choose a shorter **Duration** for example. Then, the combination of both VariPhrase and analog oscillators, achieving a pleasant tonal balance. In this patch, the VariPhrase oscillator is used to produce some crisp digital sounds, while its analog counterpart adds more body to the patch. Then, the innovative

Side-Band Filter which brings the noise bursts produced by the first Oscillator into tune. This filter is mainly responsible for the particular tonal character of this patch. Its effect can easily be heard by toggling the **COSM1** structure switch ON or OFF. Furthermore, this patch also illustrates the flexibility of the analog section, which allows the user to gradually change the tonal characteristic of the sound while waving his hand around the D Beam.

### 110:Sidewalk

The Side Band Filter represents one of V-Synth unique features. This filter shapes noise-like spectrums into musical waveforms by removing all non-harmonic frequencies found in the original source. Its effect is best heard through the preset patch called [**111:SBSync'd**]. In this preset, a motor noise has been used as main oscillator source. This motor can be heard by turning the COSM1/P1 knob all the way up. By slowly decreasing the same parameter, the noise-like content of the original waveform will gradually disappear until only harmonic frequencies remain. Once all non-harmonic frequencies are gone, the resulting sound can be played through the whole keyboard like any other musical instrument.

The distinctive sound of [**110:Sidewalk**] has been achieved by this same particular filter and the **COSM1/P1** knob can be used once again to increase or decrease the non-harmonic content of the filter's output. In order to discover which sample has been used to create the rhythmic feel hidden behind the patch, grab the **COSM1/P1** potentiometer and put all non-harmonic frequencies back into the sound! Aren't you surprised of what you now hear?

## Hans-Joerg Scheffler

### 240:OTODAMA-East meets west

The V-Synth is a great tool to create ethnic type sounds out of rather conventional sources like a piano multi sample. Otodama means the spirit of sound and I felt inspired by the name to use the piano waveform and see if I can turn it into a different instrument.

Oscillator one plays the sample in reverse and creates the body of the new sound.

Try setting the time to -39 and the envelope amount to a value of 63 to change the character of that OSC into a more brasslike tone. OSC2 uses another piano wave and provides the attack of the sound. Time is set to zero to freeze the waveform and the envelope modifies that so we get a very fast attack followed by a frozen sustain. Try experimenting with setting time to -63 and change the envelope shape and amount.

Use the formant to control the amount of overtones in the sound.

### 223:Cutting Edge

**223:Cutting Edge** combines a PCM wave and an analog waveform for the best of both worlds.

Try to change the waveforms for different results. This patch uses the dual filter for COSM1 with a release time that is shorter

than the release time of the TVA to produce an audible release noise like on a harpsichord or clavinet.

It's a simple trick but helps a lot to simulate the sound of a plucked string.

### 255:V-ocoder

**255:V-ocoder** sounds like a sideband filter but it isn't. This patch uses the ring modulator and LFOs to create a pulsing sound that has a breathy quality like a drum loop animating a

vocal sample. Change the pitch of OSC2 for some tonal changes. COSM1 is using the wave shaper to tame the sound of OSC1. Try different waveforms for the shaper for different results.

### 009:Phraselab

**009:Phraselab** uses the attack menu waveform and the arpeggiator to create wave sequences.

Time of OSC1 is set to zero and is controlled by an S&H LFO to create periodic changes.

Try different LFO waveforms, rates and offsets for different results. The attack and sustain menu waveforms are a great

source for giving patches an always changing character as they provide a different waveform for every key. In their original form every key is tuned to the same pitch which can get a bit boring. Activate ROBOT to have the pitch of these waveforms follow the keyboard. Now you can play melodies that have a different sound on every note.

## ▶▶▶ Other Tips

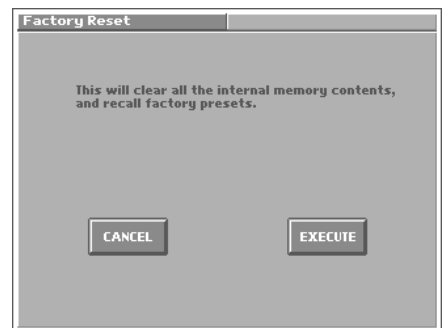
- Reset to Default Factory Settings (p. 51)
- What is VariPhrase? (p. 51)
- What is the TimeTrip function? (p. 52)
- What kinds of audio file can be loaded? (p. 52)
- What is the resampling function? (p. 52)
- Preset Patches (p. 52)
- Enabling/Disabling the Beep Tone (p. 53)
- Adjusting the Sensitivity of the D Beam Controller (p. 53)

## Reset to Default Factory Settings

This restores all data in the V-Synth to the factory settings (**Factory Reset**).

1. Press **[MODE]**. The **V-SYNTH MODE MENU** window appears.
2. Touch **<FACTORY RESET>**. The Factory Reset screen appears.
3. Touch **<EXECUTE>** to execute the Factory Reset. When the display indicates "COMPLETED!," the factory reset operation has been completed.

**\* If there is important data you've created that's stored in the V-Synth's internal memory, please make sure it is backed up before you perform a Factory Reset. All data is discarded when a Factory Reset is performed. If you want to keep the existing data, back it up on a PC card, to a computer via USB, or transmit it to an external MIDI device and save it.**



## What is VariPhrase?

VariPhrase has the following advantages:

1. Capable of changing the pitch, rate of time expansion/compression and voice characteristics (formant) on a real-time basis.
2. Allows easy synchronization to tempo and pitch.
3. A single sample covers an extended range of keys compared to conventional digital samplers.
4. Retains sound quality, while implementing the above three advantages. **VariPhrase** overcomes many problems that conventional samplers and digital recorders have with audio phrases.

Typical issues with Digital Samplers and Digital recorders

- Changing tempo affects Pitch.
- Changing the pitch of phrases affects tempo and formant of the sound.
- Limited control of audio phrases. You cannot adjust a partial section of a sound in real-time.
- Most samplers require multiple samples over limited key ranges for realistic playback of a sound.
- Samples of the same tempo must be available for performing chords, otherwise the notes of the chord will be out of sync.
- Pitch or tempo changes on Digital samplers tends to degrade audio quality.

VariPhrase solves all of these problems.

## What is the TimeTrip function?

---

One of the advantages of **VariPhrase** is that the playback location and speed of the wave can be changed in real-time. The **TimeTrip** function takes advantage of this ability to manually control the playback location and speed of the wave.

In patches that use VariPhrase, switch the TimeTrip Pad function to “**TIME TRIP**” to use this function. While playing the keyboard, touch the TimeTrip pad and the currently sounding wave will stop at the

current playback location. Then as you move your finger from that point in a circle, the wave playback will advance in the direction of conventional playback (clockwise), or the reverse (counterclockwise). Unlike “scratching” on a turntable, this lets you control the playback without affecting the pitch, so you can play the sound at the pitch you specify from the keyboard.

You can use the **D Beam controller** to produce similar results.

## What kinds of audio file can be loaded?

---

WAV/AIFF format audio files created by another device can be loaded into the V-Synth and used in the same way as data you’ve sampled on the V-Synth.

## What is the resampling function?

---

The V-Synth is able to resample sounds from its internal memory. This is called resampling. In actuality, the same sounds that are output from the rear panel **MAIN OUT L(MONO), R** jacks are sampled.

### Benefits of resampling:

1. You could make complicated and elaborated sound synthesis by applying the modulation and effect processing to a sound and then applying a different set of effects and modulation to the resampled version of the sound.

2. You could sample multiple samples played simultaneously, and record them as a single sample. You can conserve voices in this way.
3. You could sample a phrase using arpeggiator, or a passage you played with modulation using **D Beam controller** and/or **TimeTrip Pad**, and record it as a single sample. You can play it as a single phrase.

Because resampling is done within the digital domain, there is no loss of sound quality.

## Preset Patches

---

One of the prominent features of the V-Synth is that you can create sounds in a way that was not considered possible on digital synthesizers. What’s more, you don’t need to have any prior knowledge of synthesizers of all—all you need to do is turn a few knobs and move a few sliders and you’ll be creating sounds in real time that are sure to surprise and thrill your audience.

Even though this instrument is totally digital, you’ll be able to experience the pleasure of creating sounds in the same way that those who used to use analog synthesizers did. And in fact, this instrument was designed specifically to allow users to rediscover the traditional sound creation process—with the help of the latest DSP and sampling technologies, of course.

In recent years, developments in sound design have focused on analog modeling and the reproduction of existing, real-life sounds—all the while keeping step with the advances in digital technology that have occurred in every sphere. While being part of such trends, the V-Synth represents a new departure because it allows the user to easily and freely create any sound imaginable, since it is a fully digital instrument.

Most of the preset patches contained within the V-Synth were designed in a way that highlights the features mentioned above. Since the sampler found on the V-Synth is quite comprehensive, with features rivaling even those of a dedicated sampler, any real-life sounds you need can be readily acquired simply by sampling them.

## Enabling/Disabling the Beep Tone

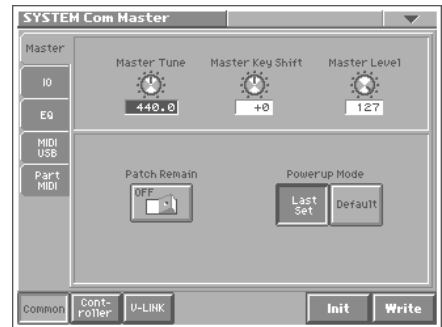
You can specify whether or not a beep tone will be heard when you touch a valid point on the touch screen.

\* At the factory setting, the beep tone will be sounded.

1. In the upper right of the screen, touch **triangle**. A drop-down menu appears.
2. In the drop-down menu, touch **<Beep>** to add a check mark. With this setting, the beep tone will be heard. If you perform the same procedure once again, the check mark will be cleared and the beep tone will no longer be heard.

Changes you make to the System function settings are only temporary—they will be discarded as soon as the power is turned off. If you want to keep any changes you've made in the system settings, you must save them in internal memory.

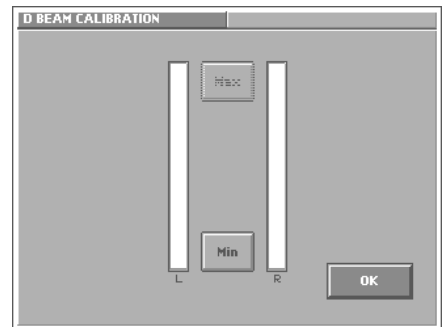
3. Press **[MODE]**. The **V-SYNTH MODE MENU** window appears.
4. Touch **<SYSTEM>**. The **SYSTEM Com Master** screen appears.
5. In the **Powerup Mode** area, select the **<Last Set>** tab.
6. Touch **<Write>**, located in the lower right of the screen.



## Adjusting the Sensitivity of the D Beam Controller

Perform this adjustment if the D Beam controller is functioning incorrectly, such as responding even though you have not operated it.

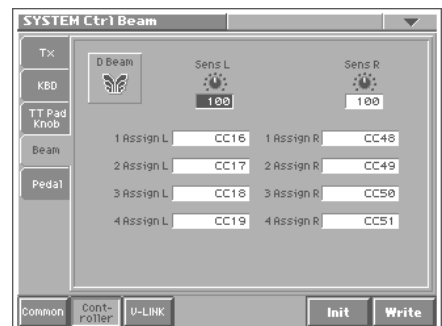
1. Press **[MODE]**. The **V-SYNTH MODE MENU** window appears.
2. Touch **<CALIBRATION>**. The **CALIBRATION MENU** screen appears.
3. In the **CALIBRATION MENU** screen, touch **<D BEAM>**. The **D Beam CALIBRATION** screen appears. When you place your hand over the D Beam controller, the "L" or "R" level meter in the screen will move upward or downward.
4. First specify the location at which the D Beam controller will begin responding (i.e., the minimum value). Move your hand toward the D Beam controller, and touch **<Min>** at the point where you want the controller to begin responding.
5. Next specify the location at which the D Beam controller will reach the peak (i.e., the maximum value). Continue moving your hand toward the D Beam controller, and touch **<Max>** at the point where you want the peak response to occur.
6. While watching the level meter in the screen, raise and lower your hand to check the response of the D Beam controller.
7. If you are satisfied with the response, touch **<OK>**. The sensitivity of the D Beam controller will be calibrated.



Changes you make to the System function settings are only temporary—they will be discarded as soon as the power is turned off. If you want to keep any changes you've made in the system settings, you must save them in internal memory.

8. Press **[MODE]**. The **V-SYNTH MODE MENU** window appears.
9. Touch **<SYSTEM>**. The **SYSTEM MENU** screen appears.
10. Touch **<Controller>** button at the bottom of the screen, then touch **<D beam>** tab in the left of the screen.

This sets the D Beam Controller's sensitivity. Sens L is the left side. The higher the value set, the more readily the D Beam Controller goes into effect. Normally you will leave this at "100."



# ▶▶▶ Patch List

No.	PatchName	No.	PatchName	No.	PatchName	No.	PatchName
001	MadOrchestra	034	Wondervoice	067	Galaxia	100	Harmny2Chaos
002	Harp Trek	035	LabyrinthArp	068	DBeamPsychic	101	Baby Steps
003	Dusted Loop	036	ARP Trance	069	Glass House	102	Wavescanner
004	MemoryMoke	037	Sine Bell	070	Psycho	103	SteproSwank
005	Hyperballad	038	Mekongscape	071	GlassCluster	104	Pluck-Morph
006	Heavy Drone	039	Bon Voyage	072	Decompose	105	Synapse 2
007	VoixBulgares	040	Acetate arp	073	V-aterphone	106	In a Hurry
008	Voco Bass	041	Little Fluff	074	La Magia	107	INSPIRATOR
009	Phrase Lab	042	Big Fluff	075	TT Creatures	108	Tribal SBF
010	Quasimodo	043	Chariosity	076	Gutter Shaku	109	Bo`sides now
011	Time Warper	044	Radar Arp	077	Dive Bomber	110	Side walk
012	Poppy Day	045	Tangy Speed	078	ScottishMess	111	SBSync'd
013	Jet Bass	046	Chorduroy	079	DA Converter	112	Triple Wha
014	Trip of Time	047	Synthetik	080	Sleeping Bs	113	Bowed Bells
015	NaNaNaHeyYaa	048	Late Lounge	081	DBeam Insect	114	Reversed Mb
016	Tardus	049	Tap Dance	082	Alien Bubble	115	Africalcool
017	120LpMixMenu	050	Dustbins	083	Talkbox	116	Running Away
018	Pulsatronic	051	Wet Balloon	084	Tetapaali	117	Funky Guru
019	Percolator	052	AKAGANI	085	HappyCartoon	118	Groovy-Doo !
020	LetThemPray	053	DanseSacrale	086	Junker Pad	119	Radon Rhythm
021	DblSweeper	054	InSaNe dJ	087	RevrsPfWater	120	BitDown Beat
022	Metalarnyx	055	Maddening Lp	088	Fireworks	121	Traship-Hop
023	TimeTripRun	056	MetalOnMetal	089	Break it !	122	XY&DB 4 Fun
024	Nylon Floop	057	NaidinTirips	090	Man-Machine	123	Hip Groove
025	GhostingGrit	058	Nemesis	091	Break Down	124	Micro Jazz
026	TalkingSteps	059	Metaluna	092	Elektronoiz	125	Rubbadub
027	Synapse 1	060	LoCo Pilot	093	e=mc^2	126	Alien Groove
028	DBeam Slap	061	Fixed Star	094	90FootSpikes	127	Machine Seq
029	StormyFunkBs	062	Spectroscope	095	Broken HAL	128	XY Artefacts
030	Look@MeEllie	063	Bird Island	096	Voxette 2003	129	LoopWaveMenu
031	Earth Temple	064	To Space	097	Piston Pulse	130	085LpMixMenu
032	Gritty Groove	065	Snowflake	098	Talkn'Slicer	131	100LpMixMenu
033	ReversedTrek	066	TTripWhisper	099	Runners	132	125LpMixMenu

No.	PatchName	No.	PatchName	No.	PatchName	No.	PatchName
133	140LpMixMenu	173	Eclipse	213	Retro-Disco	253	HitSymphoniq
134	Voxalist	174	Aurora	214	Greasy Comb	254	Fire Bird
135	Formanteer's	175	Ghost	215	Hi-Lo Synth	255	V-ocoder
136	Idle Chatter	176	Tape Strings	216	V-Analog	256	SpectraPiano
137	Thinband Vox	177	VellatronStr	217	Wavezitar	257	AquaticPiano
138	Spongle	178	Stringerz	218	On the Edge	258	JD Piano
139	FmleVocalise	179	Shakin'Str	219	STALKER	259	MK-80 Rhodes
140	MOOD SCAT	180	Think Ployd	220	Legacy	260	Piano Warp
141	Babylon Talk	181	Stringent	221	Phasorblade	261	Vox Clavi
142	TimeTripMonk	182	DBeamFrmntVn	222	LiquidRubber	262	Keywave Klav
143	AfricanCharm	183	GoodOldJive	223	Cutting Edge	263	FM V-Klav
144	Virgo	184	Euro Flute	224	ElectricWah	264	V-Lo Klaver
145	Hybrid Scat	185	Vellatron Fl	225	NOT Sync!	265	ClaviWahWah
146	Vocalese	186	Tape Flute	226	DigiHarp	266	Nylon Shapes
147	GizmoVox	187	Soft Pan Flt	227	Winter night	267	OpticalOrgan
148	Vocalizing	188	Wind Ctrler	228	Krystal Bell	268	Prog Organ
149	Overtones	189	Drunk Alto	229	Remember D50	269	CathedrPipe
150	Vocal Pad	190	ArpyClarinet	230	FrmntSwpBell	270	Wave Bass
151	Choir&Prayer	191	Big Bamboo	231	Steamwires	271	Voyager Base
152	Monetary	192	Digier-V-doo	232	Enigmatics	272	Boogie Bs
153	Choral Beam	193	Feedback Osc	233	Sympathizer	273	Blackness Bs
154	Vox Dreams	194	Whoover	234	Kalimberd	274	Mini\$#@#Right
155	Glass Choir	195	Wave Ripper	235	Piggy Picker	275	Reso Atk Bs
156	Initiation	196	Sinkkasten	236	MidEastDrone	276	Dark Bass
157	Tomorrow	197	TopOfTheWrld	237	Gangescape	277	Mini Me
158	Flotation	198	Think Lead	238	Distant Land	278	Dance Bs 1
159	Twilight	199	Feel no pain	239	Ethno Synth	279	Dance Bs 2
160	Glass Pad	200	NastyLead	240	OTODAMA	280	Kick Bass
161	FuzzyHeaven	201	Sine ahead	241	Buzzards	281	BassTryAfter
162	Padus	202	Tea Bea Lead	242	Scale tuned	282	WShapeBass1
163	Filmy Synth	203	Scratch Lead	243	Clip Clop	283	WShapeBass2
164	Fluty Pad	204	Brassy Lead	244	Metal Pearls	284	Retro-Singer
165	Ringbearer	205	Solo Square	245	Coffee Break	285	DigiDharma
166	Smoothie	206	FragileVoice	246	Vudu	286	SpyCarGetawy
167	Touchpad Pad	207	Shuu Lead	247	Dyna Dholak	287	Harem Dance
168	Resonus	208	Cla Lead	248	Dyna Tabla		
169	SloSyncSweep	209	Asian Lead	249	Kick Menu		
170	BriteVektars	210	ConstructBts	250	Snr&Tom Menu		
171	Brass Pad	211	Pulsactive	251	Rave Cave		
172	Tight Wire	212	Thick Sine	252	11 Staccato		

\* Patch numbers 288 and above were left empty when the instrument left the factory. Use them to store patches that you create.

## Waveform List

\* The number in front of the name indicates the original tempo (BPM).

\* **Waveforms with a "+" symbol at the end of the name:**

Events have already been specified for the wave. For details regarding event, refer to "Playback Mode (PCM Oscillator Playback Mode)".

\* **Waveforms with a "-M" symbol at the end of the name:**

This is a multisample wave. It consists of a multiple number of waves, each of which has been separately sampled for a specific pitch range.

\* **VS:** The velocity switch is enabled. The sound will change in response to the dynamics of your keyboard playing. VS1 and VS2 are variations of the velocity switch.

\* Wave numbers 325 and above were left empty when the instrument left the factory. Use them to store waves that you create.

### Loops

#### Morphing/Sequence

No.	Waveform Name
001	108 MrphSyn +
002	058 VoxSwp +
003	114 SyncSwp +
004	157 PGSweep +
005	126 WaveTbl +
006	119 SpctSeq +
007	123 FrmtSeq +
008	120 Vox Seq +
009	120 WindSeq +
010	120 PlckSeq +
011	115 XLp01 +
012	098 XLp02 +
013	085 XLp03 +
014	111 XLp04 +
015	160 XLp05 +
016	123 D50Lp01
017	123 D50Lp02
018	123 D50Lp03
019	123 D50Lp04
020	123 D50Lp05 +
021	123 D50Lp06 +
022	123 D50Lp07 +
023	123 D50Lp08 +
024	123 D50Lp09 +
025	123 D50Lp10 +
026	123 D50Lp11 +
027	123 D50Lp12 +
028	123 D50Lp13 +
029	123 D50Lp14 +
030	123 D50Lp15 +
031	123 D50Lp16 +
032	123 D50Lp17 +

#### Phrase

No.	Waveform Name
033	160 Slicer1 +
034	160 Slicer2 +
035	120 Slicer3 +
036	120 MuscBel +
037	120 Spectre +
038	100 GtrArpg +
039	113 WahGtr +
040	116 WahCutG +
041	117 FunkGtr +
042	090 FuzzGtr +
043	120 PFLick1 +
044	088 PFLick2 +
045	120 Glocken +
046	104 Kalimba +
047	144 AfroXyl +
048	090 HipHpJz +
049	100 HipHop +
050	145 TechHH +
051	145 TechK&H +
052	115 TambGrv +
053	090 AcidJz +
054	090 BrshSnr +
055	104 Shakin' +
056	132 Bottle +
057	140 Bongo +
058	132 Conga +
059	090 Dholak +
060	090 TablaBy +
061	120 Cuica +
062	140 Tribal +
063	080 MakeGrv +
064	080 NotHear +
065	126 Scat 1 +
066	137 Scat 2 +
067	088 NaNaNa +
068	110 Dance

### Elements

#### Voice

No.	Waveform Name
069	M Ooohz +
070	F WoYeah +
071	M OhYeah +
072	F Aah
073	F Uuh
074	F Hum
075	F Nm
076	F Shuu
077	M Doo
078	M Nah
079	M Grow Nm
080	Soprano Vib
081	F India Aah
082	Tuvan Low

#### Choir

No.	Waveform Name
083	M Ahs Lo
084	M Ahs Mid
085	M Ahs Hi
086	F Ahs Mid
087	F Ahs Hi
088	M Oohs
089	Organ Vox

#### Strings/Orchestra

No.	Waveform Name
090	Vn Vib
091	Vn BartkPizz
092	Vc Vib
093	JV Str Lo
094	JV Str Hi
095	JP Strings
096	OB Strings
097	OBXP Str
098	JP Soft Pad
099	D-50 Heaven
100	Orch Penta
101	OrchCluster

#### Brass/Wood Winds

No.	Waveform Name
102	Brs Cluster
103	Brs Swell
104	Brass ff
105	Brs Fall
106	Trumpet Vib
107	TpHarmonMute
108	Trombone
109	AltoSax Vib
110	Flute Vib
111	Punchy Flute
112	Oboe Vib
113	Clarinet Vib
114	Bass Cl Vib
115	Bassoon

#### Ethnic

No.	Waveform Name
116	Steamer
117	Moceno
118	Shaku Vib
119	Hichiriki
120	Qu Di Vib
121	Sona Vib
122	Shanai Orn
123	Didgeridoo
124	Sitar Drone
125	Santur
126	Sanxian
127	Tsugaru
128	Biwa
129	Berimbau
130	Buzz Kalimba
131	Sanza
132	Vib Kalimba
133	Gender
134	Glass Harp
135	FingerCymbal

#### Piano/Keyboard/Mallet

No.	Waveform Name
136	Ac.Piano Lo
137	Ac.Piano Mid
138	Ac.Piano Hi
139	JD Piano Lo
140	JD Piano Mid
141	JD Piano Hi
142	Rhodes Lo
143	Rhodes Mid
144	Rhodes Hi
145	MK-80 EP Lo
146	MK-80 EP Mid
147	MK-80 EP Hi
148	Wurly Lo
149	Wurly Mid
150	Wurly Hi
151	Clav Lo
152	Clav Mid
153	Clav Hi
154	Vibes
155	Marimba Lo
156	Marimba Mid

#### Guitar/Organ/Bass

No.	Waveform Name
157	Nylon Gt Lo
158	Nylon Gt Hi
159	Steel Guitar
160	SteelGtSlide
161	Clean Gt Lo
162	Clean Gt Mid
163	Clean Gt Hi
164	Heavy Guitar
165	WahDelay Gtr
166	Rotary Gtr
167	B-Organ
168	Power-B fast
169	Ac.Bass
170	Pick Bass
171	Finger Bass
172	Bass Slide

## Elements

### Synth

No.	Waveform Name
173	JU-2 Sub OSC
174	260 Sub OSC
175	Spectrum 1
176	Spectrum 2
177	Bellwave
178	Vibwave
179	TR-808Claves
180	TR-808Cowbel
181	Digiwave
182	Wire String
183	JP-8000 FBK
184	JP-8000 PWM

### Noise/FX/Hit

No.	Waveform Name
185	Atmosphere
186	MG PinkNoise
187	P5 Noise
188	Rezo Noise
189	ZZZ loop
190	Bomb Noise
191	Radio Noise
192	Vinyl Noise
193	Cymbal Loop
194	Jet Plane
195	Turbine
196	Afro Cheer
197	Rain
198	Propeller
199	120 Steamn' +
200	150 Scratch1
201	136 Scratch2
202	124 MG Zap
203	150 Water
204	Harpin'Piano
205	Piano Thump
206	SteelGt Noiz
207	ET Flex
208	Waterpan Hit
209	PCM Press
210	Glass Break
211	Firework
212	Smear Hit
213	ClasicHousHt
214	Orch Hit

### Percussion

No.	Waveform Name
215	Sleigh Bell
216	Wind Chime
217	Cowbell
218	Conga Lo Op
219	Dumbek
220	Bendir
221	UdoPot Long
222	UdoPot Mute
223	Cuica Mute
224	Cuica Open
225	Nylon Perc

### Drums

No.	Waveform Name
226	Studio Kick
227	TR-808 Kick
228	TR-909 Kick1
229	TR-909 Kick2
230	StdSnr VS
231	StdSnr
232	StdSnr RmSht
233	StdSnr Stk
234	R&B Snr
235	TR-808 Snr
236	TR-909 Snr
237	TR-808 Rim
238	TR-909 Clap
239	Rock Tom Lo
240	TR-909 Tom
241	Studio HH Cl
242	Studio HH Op
243	TR-808 HH Cl
244	TR-808 HH Op
245	Crash Cymbal
246	Ride Cymbal
247	Gong

## Multi-samples

### No. Waveform Name

248	Ac.Piano A-M
249	Ac.Piano B-M
250	Ac.Piano C-M
251	Ac.PianoVS-M
252	JD Piano A-M
253	JD Piano B-M
254	JD Piano C-M
255	JD PianoVS-M
256	Rhodes A -M
257	Rhodes B -M
258	Rhodes C -M
259	Rhodes VS -M
260	MK80EP A -M
261	MK80EP B -M
262	MK80EP C -M
263	MK80EP VS1-M
264	MK80EP VS2-M
265	Wurly A -M
266	Wurly B -M
267	Wurly C -M
268	Wurly VS1 -M
269	Wurly VS2 -M
270	Clav A -M
271	Clav B -M
272	Clav C -M
273	Clav VS1 -M
274	Clav VS2 -M
275	Marimba A -M
276	Marimba B -M
277	Marimba C -M
278	MarimbaVS1-M
279	MarimbaVS2-M

### No. Waveform Name

280	NylonGt A -M
281	NylonGt B -M
282	NylonGt C -M
283	NylonGtVS1-M
284	NylonGtVS2-M
285	M+F Ahs A -M
286	M+F Ahs B -M
287	M+F Ahs C -M
288	JV Str A -M
289	JV Str B -M
290	JV Str C -M
291	JV Str VS1-M
292	JV Str VS2-M
293	OB Str A -M
294	OB Str B -M
295	OB Str C -M
296	OB Str VS1-M
297	OB Str VS2-M
298	D-50Hvn A -M
299	D-50Hvn B -M
300	D-50Hvn C -M
301	D-50HvnVS1-M
302	D-50HvnVS2-M
303	Brass A -M
304	Brass B -M
305	Brass C -M
306	Brass VS1 -M
307	Brass VS2 -M
308	Fl Vib A -M
309	Fl Vib B -M
310	Fl Vib C -M
311	Fl Vib VS -M

## Menu waves

### No. Waveform Name

312	LoopMenu 1 +
313	LoopMenu 2 +
314	LoopMenu 3 +
315	LoopMenu 4 +
316	ElmentMenu 1
317	ElmentMenu 2
318	ElmentMenu 3
319	ElmentMenu 4
320	ElmentMenu 5
321	ElmentMenu 6
322	ElmentMenu 7
323	Attack Menu
324	Sustain Menu

# Understanding Sound

Randomly moving controls on the panel or changing parameters in the menus is not the best method of arriving at musically useful sounds. Before attempting to create new sounds on your V-Synth, you should be aware of some fundamental audio principles and how these apply to synthesizers in general. The concepts and examples in this section have been kept relatively basic for readers with little or no previous experience of synthesizers.

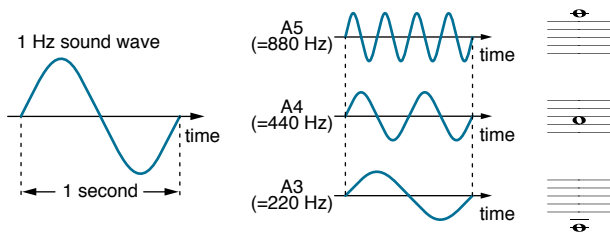
## What is Sound?

Throughout our lives we are constantly surrounded by sounds of all kinds. Physically, sound waves are contractions and expansions in the air, rapid changes in air pressure which cause our ear-drums to vibrate (like a microphone capsule) and send corresponding signals to the brain. The physical attributes of a sound wave determine how it is perceived, and the three elements we can all recognize are **pitch**, **brightness** and **volume** (loudness).

## Pitch

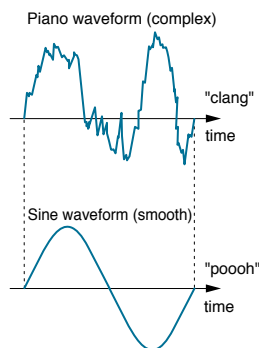
The pitch of a note depends upon how rapidly the wave repeats itself. A more scientific and general term for pitch is **frequency**, measured in **Hertz (Hz)**. 1Hz is defined as 1 cycle (repetition) per second.

Higher frequency notes have higher pitch. Doubling or halving the frequency of a note shifts the pitch up or down an **octave** - the most harmonic interval of all. For example, the note A4 (middle A) has a standard frequency of 440 Hz, so A5 is 880 Hz and A3 is 220 Hz.



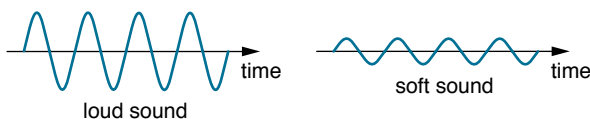
## Brightness

The brightness of a wave is generally determined by how complex it is. The less smooth the waveform, the brighter it sounds. If you compare a piano waveform with a sine wave using an oscilloscope, it is easy to see why the piano note sounds brighter than the sine wave.



## Volume

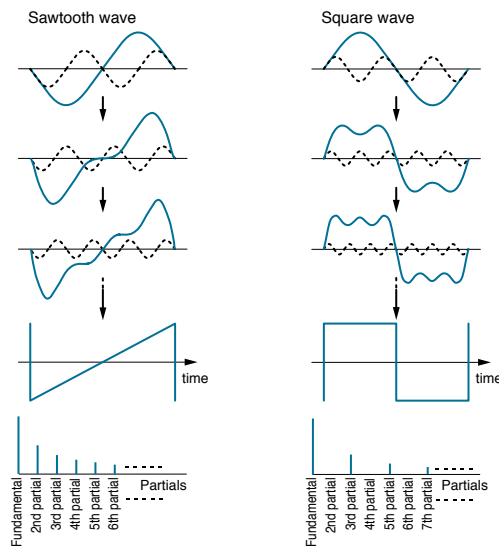
The volume of a sound is determined by its **amplitude**, which is basically the absolute difference between peaks and troughs in the wave i.e. its height in the diagram below. Louder sounds have higher amplitude, and softer sounds have lower amplitude.



## Manipulating Partial

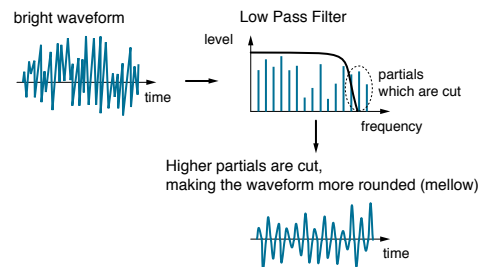
A mathematician called Fourier once proved that any sound at all, from a dog barking to the complete works of Rachmaninov, can be described as a time-variant mixture of many sine waves known as **partials** or **overtones**. A very large number of sinewave oscillators, each with independent control of frequency and amplitude would be necessary to emulate even a dog barking. That is why this **additive synthesis** is much less common than **subtractive synthesis** - selectively removing partials from complex waveforms.

Nevertheless, viewing a complex waveform as the sum of its component partials is useful to understand how subtractive synthesizers work. The typical sawtooth and square waves in any subtractive synthesizer consist of a **fundamental** (the basic frequency) plus integer multiples of this frequency (2x, 3x ... and so on). Such integer multiples are called **harmonic partials**, while the non-integer multiples particularly prominent in drums or natural (non-instrumental) sounds are called **inharmonic partials**.



## Filters

The more high-frequency partials there are in a sound, the brighter it will be. Removing some of the higher partials from bright waveforms using a **Low Pass Filter** will make the sound mellower, and this is the basic method used in subtractive synthesis. Many subtractive synthesizers have an optional **High Pass** filter to remove lower partials and/or a **Band Pass** filter to remove high and low partials at the same time, leaving those in the middle unaffected. Whatever types of filter are used, all subtractive synthesizers need waveforms with a rich assortment of partials so that sounds can be modified in interesting ways.



Before being sent through the filter, additional partials can be created using several methods of interaction between oscillators e.g. synchronisation (Sync), Ring Modulation (RM) or Frequency Modulation (FM), as well as various distortion techniques.

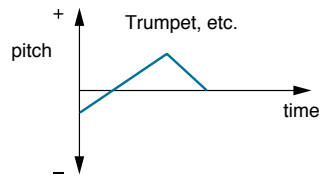
# Understanding Sound

## Time-variant timbral changes (Envelopes)

Listening to any acoustic instrument, you will often hear changes in brightness and volume within each note. Synthesizers make use of Envelopes to emulate these effects.

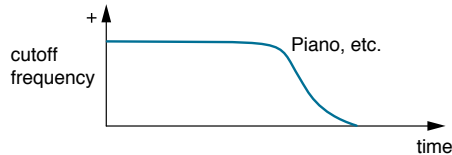
### Pitch Envelope

Especially brass and woodwind instruments exhibit a rapid pitch change at the beginning of each note. The diagram below shows the typical time-variant pitch change of the trumpet. Synthesizers make use of Pitch Envelopes to emulate such effects:



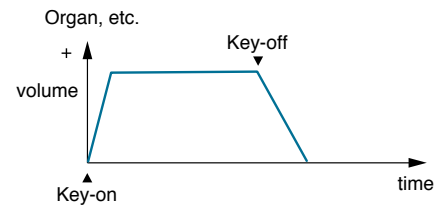
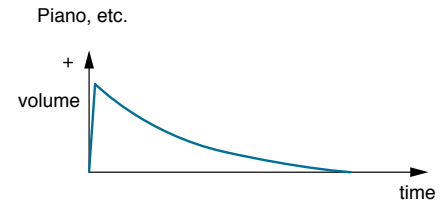
### Filter Envelope

Notes played on plucked or hammered instruments such as the guitar, piano or drums start relatively bright, then become increasingly mellow as the sound decays. This behaviour can be emulated in synthesizers using the Filter Envelope:



### Amplifier Envelope

Notes played on plucked or hammered instruments generally decay down to silence, while on instruments such as organ or violins, they can carry on indefinitely at the same level. Either of these basic forms can be emulated in synthesizers using the Amplifier Envelope.



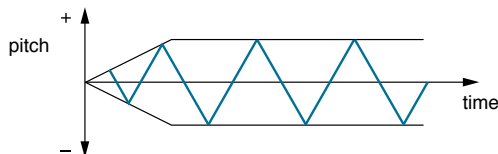
## Adding Expression to a Sound

### Low Frequency Oscillators (LFO)

LFOs can be applied to the three basic elements of a sound (pitch, brightness and volume) to make sounds less static than they would otherwise be and give sounds a "human touch". Most modern synthesizer keyboards include wheels or joysticks as well as aftertouch (pressure on the keyboard) which can be used for realtime control over LFO modulation depth.

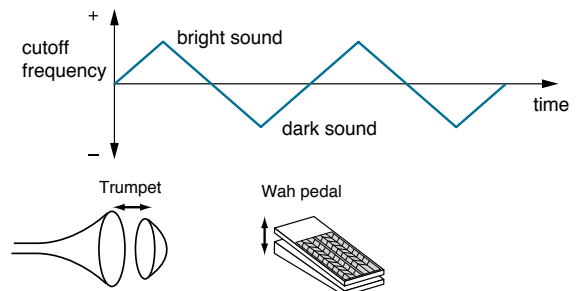
### Vibrato

Vibrato is a cyclic modulation of pitch. Vibrato techniques are often used by singers as well as instrumentalists (e.g. strings or saxophone) for maximum emotional effect.



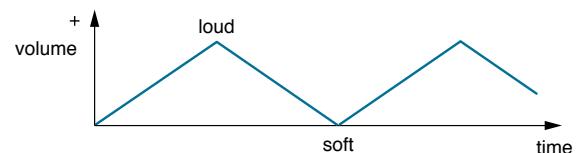
### Wah

Wah (originally "wah-wah") is a cyclic modulation of brightness. Wah techniques are often applied by trumpet players (using a cup-mute), blues harmonica players or electric guitarists (using a wah pedal) to emulate some typical formants of the human voice.



### Tremolo

Tremolo is a cyclic modulation of volume. A speciality of flute and string players, tremolo is also available in electric pianos and guitar-amplifiers with built-in tremolo units.



# Specifications

## V-Synth: Synthesizer Keyboard

### Keyboard

61 keys (with velocity and channel aftertouch)

### Sound Generator Configuration

Oscillator (envelope x 4 + LFO x 1) x 2

Modulator x 1

COSM (envelope x 2 + LFO x 1) x 2

TVA (envelope x 1 + LFO x 1) x 1

### Methods by Which Oscillators Produce Sound

Analog Modeling,  
PCM / VariPhrase (Preset waveforms + Sampling waveforms),  
External Input

### Modulator

4 types + MIX

### COSM

15 types + THRU

### Zones (Splits)

16

### Parts

16

### Maximum Polyphony

24 voices  
(Varies depending on the load placed on the sound generator.)

### Internal Memory

Project: 1

Patches: 512

Waves: 999

Wave memory (RAM): 50 M bytes (When the unit ships from the factory, 30 M bytes of this is taken up by the preset waves.)

Sample storage memory (FLASH): 10 M bytes

### External Storage Device

PC CARD slot (Microdrive, SmartMedia or CompactFlash can be used with PC card adapter.)

### Effects

MFx (Multi-effects): 41 sets

Chorus: 8 sets

Reverb: 10 sets

### System EQ

4 bands

### Sampling Frequency

Internal: 44.1 kHz

Digital Audio IN/OUT: 96, 48, 44.1 kHz

### Signal Processing

Internal processing

sound generating section: 32 bits (floating point)

effects section: 24 bits (fixed point)

DA Conversion: 24 bits

AD Conversion: 24 bits

### Nominal Output Level

MAIN OUT: +4 dBu

DIRECT OUT: +4 dBu

### Nominal Input Level

INPUT (LINE): -20 dBu

INPUT (MIC): -46 dBu

### Arpeggiator

Patterns: User programmable  
(support use of control change messages)

Motifs: 8 types

Tempo: 20 to 250 BPM

## Display

Graphic 320 x 240 dot backlit LCD with touch screen

## Controllers

Pitch Bend / Modulation Lever

TimeTrip Pad

D Beam Controller (Twin beam)

Assignable Control Knobs (C1, C2)

## Connectors

Headphones Jack

Main Output Jacks (L/MONO, R) (1/4 inch phone type)

Direct Output Jacks (L, R) (1/4 inch phone type)

Input Jacks (L, R) (1/4 inch phone type) (Equipped with line/mic gain switch)

Hold Pedal Jack

Control Pedal Jacks (1, 2) (assignable)

MIDI Connectors (IN, OUT, THRU)

USB Connector

Digital Audio Interface (24-bit, S/P DIF)

COAXIAL (IN, OUT)

OPTICAL (IN, OUT)

AC Inlet

## Power Supply

AC 117 V, AC 230 V, AC 240 V

## Power Consumption

16 W

## Dimensions

1,056 (W) x 398 (D) x 111 (H) mm

41-5/8 (W) x 15-11/16 (D) x 4-3/8 (H) inches

## Weight

13.1 kg / 28 lbs 15 oz

## Accessories

Quick Start

Owner's Manual

Sound List

CD-ROM (Driver)

PC CARD Protector

Power Cable

## Options

Keyboard Stand: KS-12

Pedal Switch: DP-2/6/8

Foot Switch: BOSS FS-5U

Expression Pedal: EV-5, BOSS FV-300L

Mic: DR-20

(0 dBu = 0.775 V rms)

**\* In the interest of product improvement, the specifications and/or appearance of this unit are subject to change without prior notice.**

▶▶▶ **I n d e x**

**A** ADSR 31  
 AIFF 40  
 AMP 21  
 Analog 16  
 arpeggiator 35  
 AUTO 37

**B** BACKING 30  
 Backing Up 40  
 BENDER 10  
 BUTTON 10

**C** C1 37  
 C2 37  
 CHO 27  
 Chorus 27  
 COMB 23  
 COMP 24  
 CONTROL 10  
 COSM 21

**D** D Beam 37  
 DEC/- 11  
 Delay 27  
 DIR 27  
 Dive 33  
 DOWN 35  
 DUAL 23  
 DYN-TVF 24

**E** effects 27  
 Encoding 28, 30

ENSEMBLE 30  
 ENV RING 20  
 envelopes 31  
 Events 30  
 EXT IN 16

**F** FAT 17  
 Flanging 27  
 FM 19  
 FORMANT 18  
 Freezing 32  
 Freq KF 13  
 F-SHIFT 25

**G** General 28  
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# MEMO

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