YAMAHA

Virtual Acoustic Synthesizer

VL1

Getting Started

VL1

Virtual Acoustic Synthesizer



Getting Started

Owner's Manual 1

Contents

Precautions 4

About the Manuals 6

■ The Getting Started Manual (this manual) 6
■ The Feature Reference Manual 7
■ Conventions 7

VL1 Basics 8

Essential Concepts for the VL1 User

■ What Are the Advantages? 9
■ The VL1 Model 10
The Instrument 10
The Controllers 12
The Modifiers 13
■ There's More 15

The Controls & Connectors 16

A Brief Introduction To the VL1 Interface

■ Front Panel 17
■ Rear Panel 20

Setting Up 22

System Connections & Preparation

■ Power Supply 22
■ Controllers 23
Breath Controller 23
Foot Controllers 23
Foot Switches 23
■ Audio Connections 23
Headphones 23
Stereo Sound System 24
■ MIDI Connections 24
■ Power-on Procedure 25
■ Play the Demo 26
■ Breath Controller Calibration 29
■ Load the Pre-programmed Voice Data 31



Voice Selection 34
Selecting & Playing the VL1's 128 Voices

- Using the Voice Directory 36
- The Pre-programmed VL1 Voices 37

The Controllers 38
Natural Musical Nuance and Expressive Control

- Physical Controllers 39
- VL1 Controller Parameters 40
- Controller Views 41
- Some Exercises With the AltoSax Controllers 42
- Controller Envelopes 46
- Other Controller Views 47

Mixing & The Modifiers 48
Creating New Timbres and Original Voices

Mixing 48
- An Exercise: Remix the Pan Pipes Voice 49

The Modifiers 51
- Harmonic Enhancer 51
- Dynamic Filter 54
- Frequency Equalizer 55
- Impulse Expander 56
- Resonator 57

Effects 58
Creating the Right Ambience

- Modulation Effects 59
- Feedback Delay Effects 59
- Reverb Effects 60

Index 62

Precautions

!! PLEASE READ THIS BEFORE PROCEEDING !!

■ Location

Do not expose the instrument to the following conditions to avoid deformation, discoloration, or more serious damage.

- Direct sunlight (e.g. near a window).
- High temperatures (e.g. near a heat source, outside, or in a car during the daytime).
- Excessive humidity.
- Excessive dust.
- Strong vibration.

■ Power Supply

- Turn the power switch OFF when the instrument is not in use.
- The power supply cord should be unplugged from the AC outlet if the instrument is not to be used for an extended period of time.
- Unplug the instrument during electric storms.
- Avoid plugging the instrument into the same AC outlet as appliances with high power consumption, such as electric heaters or ovens. Also avoid using multi-plug adaptors since these can result in reduced sound quality and possibly damage.

■ Turn Power OFF When Making Connections

- To avoid damage to the instrument and other devices to which it is connected (a sound system, for example), turn the power switches of all related devices OFF prior to connecting or disconnecting audio and MIDI cables.

■ MIDI Connections

- When connecting the VL1 to MIDI equipment, be sure to use high-quality cables made especially for MIDI data transmission.
- Avoid MIDI cables longer than about 15 meters. Longer cables can pick up electrical noise that can causes data errors.

■ Handling and Transport

- Never apply excessive force to the controls, connectors or other parts of the instrument.
- Always unplug cables by gripping the plug firmly, not by pulling on the cable.
- Disconnect all cables before moving the instrument.
- Physical shocks caused by dropping, bumping, or placing heavy objects on the instrument can result in scratches and more serious damage.

■ Cleaning

- Clean the cabinet and panel with a dry soft cloth.
- A slightly damp cloth may be used to remove stubborn grime and dirt.
- Never use cleaners such as alcohol or thinner.
- Avoid placing vinyl objects on top of the instrument (vinyl can stick to and discolor the surface).

■ Electrical Interference

- This instrument contains digital circuitry and may cause interference if placed too close to radio or television receivers. If this occurs, move the instrument further away from the affected equipment.

■ Data Backup

- The VL1 contains a special long-life battery that retains the contents of its internal memory even when the power is turned OFF. The backup battery should last for several years. When the backup battery needs to be replaced “Change battery!” will appear on the display when the power is turned on. When this happens, have the backup battery replaced by qualified Yamaha service personnel. DO NOT ATTEMPT TO REPLACE THE BACKUP BATTERY YOURSELF!

- Internal memory data can be corrupted due to incorrect operation. Be sure to save important data to floppy disk frequently so you have a backup to revert to if something happens to damage the data in memory. Also note that magnetic fields can damage data on the disk, so it is advisable to make a second back-up copy of disks that contain very important data, and keep backup disks in a safe place away from stray magnetic fields (i.e. away from speakers, appliances containing motors, etc.).

■ Handle Floppy Disks and the Disk Drive With Care

- Use only 3.5” 2HD or 2DD type floppy disks.
- Do not bend or apply pressure to the floppy disk. Do not open the shutter and touch the surface of the floppy disk inside.
- Do not expose the disk to high temperatures. (e.g. direct sunlight)
- Do not expose the disk to magnetic fields. Magnetic fields can partially or totally erase data on the disk, rendering the disk unreadable.
- To eject a floppy disk, press the eject button slowly as far as it will go then, when the disk is fully ejected, remove it by hand.
  The disk may not be ejected properly if the eject button is pressed too quickly, or it is not pressed in as far as it will go (the eject button may become stuck in a half-pressed position and the disk extends from the drive slot by only a few millimeters). If this happens, do not attempt to pull out the partially ejected disk. Using force in this situation can damage the disk-drive mechanism or the floppy disk. To remove a partially ejected disk, try pressing the eject button once again, or push the disk back into the slot and then repeat the eject procedure carefully.
- Do not insert anything but floppy disks into the disk drive. Other objects may cause damage to the disk drive or the floppy disk.

■ Service and Modification

- The VL1 contains no user serviceable parts. Opening it or tampering with it in any way can lead to irreparable damage and possibly electric shock. Refer all servicing to qualified YAMAHA personnel.

■ Third-party Software

- Yamaha can not take any responsibility for software produced for this product by third-party manufacturers. Please direct any questions or comments about such software to the manufacturer or their agents.

YAMAHA is not responsible for damage caused by improper handling or operation.

About the Manuals

The VL1 comes with two manuals — ***Getting Started*** and ***Feature Reference.***

The Getting Started Manual (this manual)

The *Getting Started* manual contains seven chapters that take you through essential information and procedures you will need to know to become familiar with your VL1:

1. VL1 Basics [≥ Page 8]
Basic concepts you'll need to understand in order to get the most out of the VL1.

2. The Controls & Connectors [≥ Page 16]
Brief descriptions of the VL1 controls and connectors, and their functions.

3. Setting Up [≥ Page 22]
System connections, powering up, playing the demo, calibrating the Breath Controller, and loading the pre-programmed voices.

4. Voice Selection [≥ Page 34]
Several ways to select and play the VL1's 128 voices.

5. The Controllers [≥ Page 38]
The VL1 controllers and how they can be assigned and edited for optimum control.

6. Mixing & The Modifiers [≥ Page 48]
Customizing the sound to suit your own personal needs.

7. Effects [≥ Page 58]
An overview of the built-in digital effects that you can use to add depth and ambience to the VL1 sound.

We recommend that you go through the chapters in sequence and actually try out the various operations described. Once you've gone through the entire Getting Started manual in this way, you should be familiar enough with the VL1 to need only the VL1 Feature Reference manual in future.

The Feature Reference Manual

The Feature Reference manual is the “nuts and bolts” reference for the VL1, individually describing its many functions in detail. The Feature Reference manual is divided into five main sections, each describing the various functions within a particular VL1 edit or utility mode.

1. General Operation [≥ Page 7]
2. Play Mode [≥ Page 13]
3. Edit Mode [≥ Page 21]
4. Utility Mode [≥ Page 151]
5. Appendix [≥ Page 177]

Once you have become familiar with the way the VL1 works by going through the Getting Started manual, you should only need to refer to the Feature Reference manual from time to time to get details on functions you’ve never used before, or refresh your memory about functions that you don’t use very often.

Each section of the Feature Reference manual has its own table of contents, so you should be able to locate any particular function quickly and easily. Functions and references can also be located by referring to the index at the back of the manual.

Conventions

The following conventions are used through the VL1 manuals to avoid confusion and make the text easier to read.

Buttons & Controls

Button and control names used on the VL1 panel appear in the text in capital letters within a border: “the ENTER button”, for example.

Parameter Names

Parameter names and other labels which appear on the VL1 display are printed in the `courier` typeface for easier identification: for example, “adjust the “`Balance`” parameter as required”.

Parameter Ranges

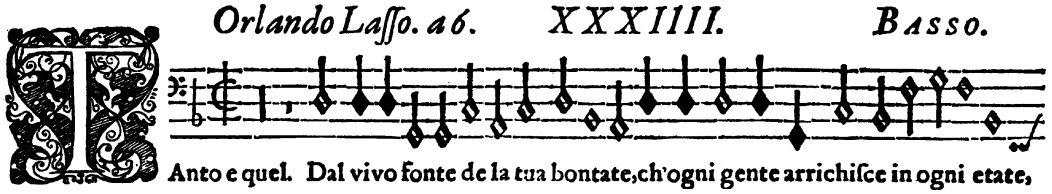
An ellipsis is used to indicate a range of parameter values: e.g. “0 … 127”. This minimizes the confusion sometimes caused by the use of a hyphen or dash for this purpose.

VL1 Basics

Essential Concepts for the VL1 User

The Yamaha VL1 Virtual Acoustic Synthesizer produces sound in an entirely new way. It has no oscillators or function generators, no preset waveforms or samples. In fact, it uses *none* of the sound generation concepts employed in conventional synthesizers. The VL1 represents the world's first practical application of computer-based "physical modeling" in musical sound synthesis.

In the same way that computer models are used to simulate weather systems or the flight characteristics of aircraft in the design stage, the VL1 simulates the very complex vibrations, resonances, reflections and other acoustic phenomena that occur in a real wind or string instrument. This requires a tremendous amount of computer processing power (weather and aerodynamic modeling require room-filling super computers), and radical advances in microprocessor speed and capability plus some very sophisticated Yamaha technology were necessary to achieve the real-time sound generation capabilities exhibited by the ground-breaking VL1 Virtual Acoustic Synthesizer.



What Are the Advantages?

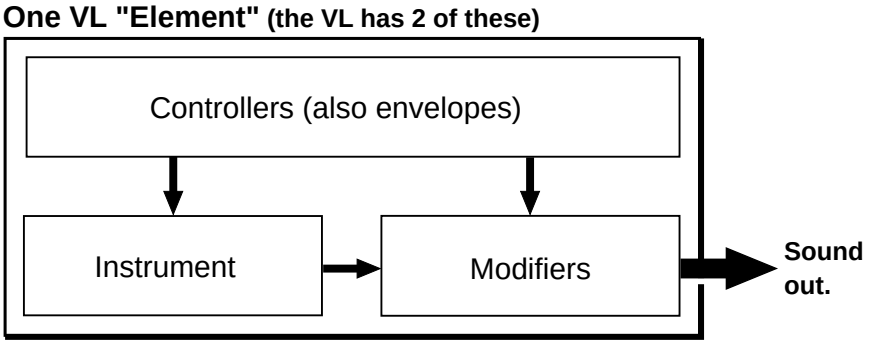


The VL1 offers many advantages in terms of musical performance. Not just in terms of sound, but also in terms of the "behavior" that makes acoustic instruments so … well, musical! But this is not because someone has programmed a certain sound or pattern of behavior into it. The physical model can be programmed to have certain attributes — the length of a pipe or the stiffness of a reed, for example — but the actual sound produced by any configuration can only be accurately determined by playing it. Of course, the same applies to the design of acoustic instruments. Because of its natural acoustic behavior the VL1 is undoubtedly a little harder to play than conventional synthesizers, but when mastered this is the very characteristic that is its greatest strength. The Yamaha VL1 is the most *musical* synthesizer ever made. A soloist's dream!

- The VL1 sounds better, has more depth, and is more realistic in the musical sense than any other synthesizer system.
- Simply pressing a key in the same way does not always produce precisely the same sound. The instrument is responsive and "alive".
- Note-to-note transitions have the same continuity exhibited by acoustic instruments. What goes on in between the notes is just as important musically as the notes themselves.
- It has extraordinary expressive capability. Rather than simply controlling parameters like volume or pitch, you can control characteristics such as breath and reed pressure with appropriate complex effects on the timbre of the sound.

The VL1 Model

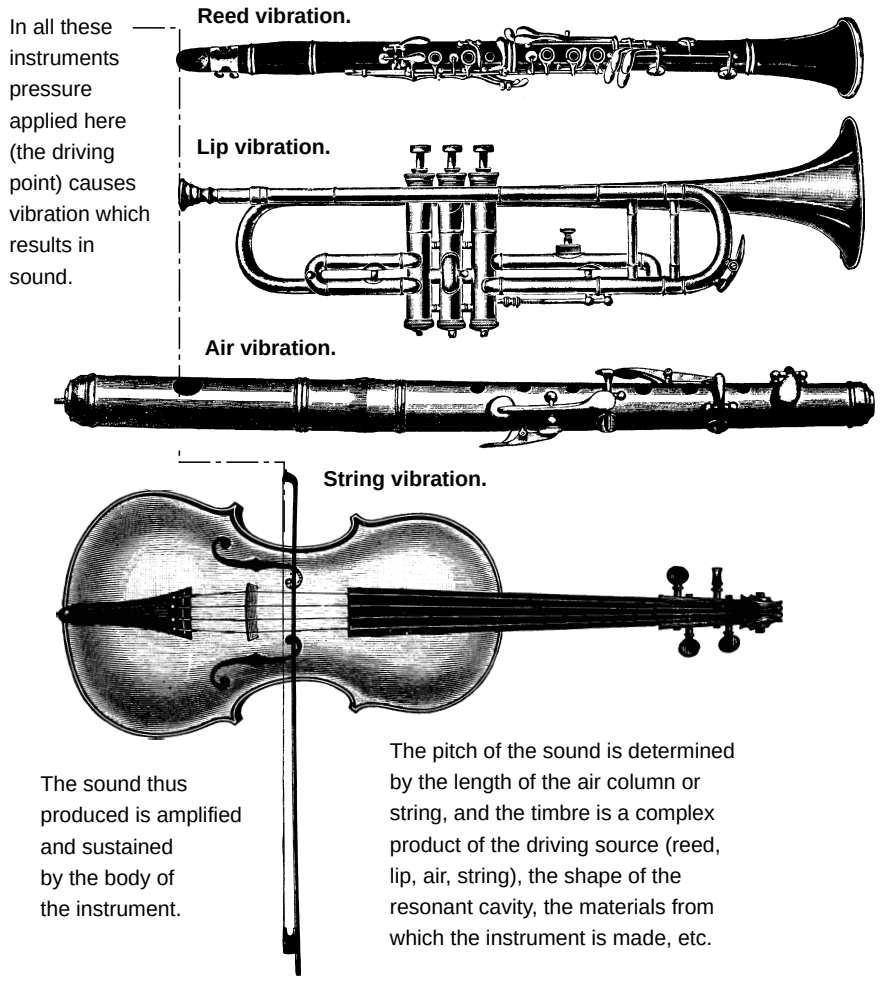
The overall VL1 model or "algorithm" consists of three main blocks: the instrument, controllers, and modifiers. In schematic form these blocks are arranged as follows:



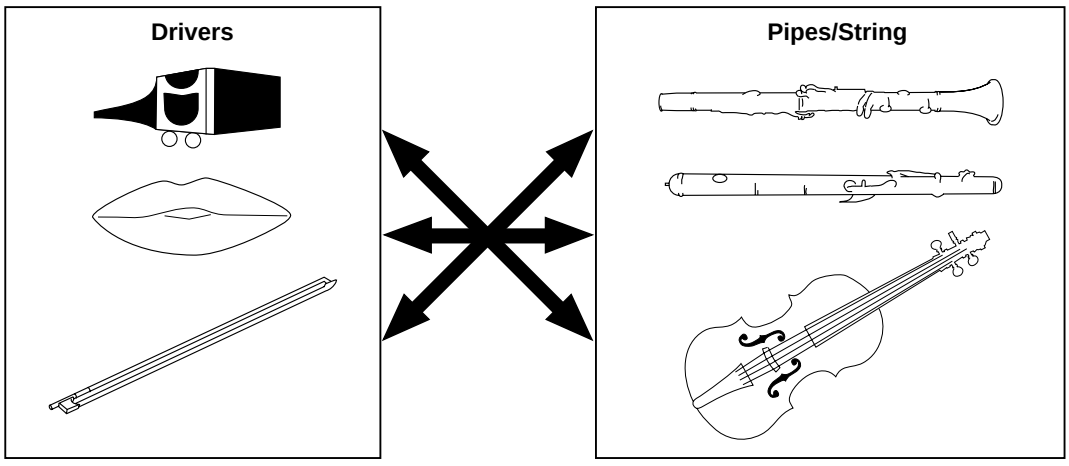
● The Instrument

The key block in this algorithm is the *instrument*, since it is here that the fundamental tone or "timbre" of the sound is defined. The extreme complexity of this portion of the model makes it unsuitable for user programming, so various instruments for the VL1 are provided in the form of pre-programmed voices. These are primarily woodwind, brass, and string voices, since the VL1's physical model is capable of most accurately simulating the sound-generating mechanism of all three instrument categories.

The instrument model consists primarily of a *driver* — the reed/mouthpiece, lip/mouthpiece, or bow/string system — and a resonant system corresponding to the tube and air column or string.



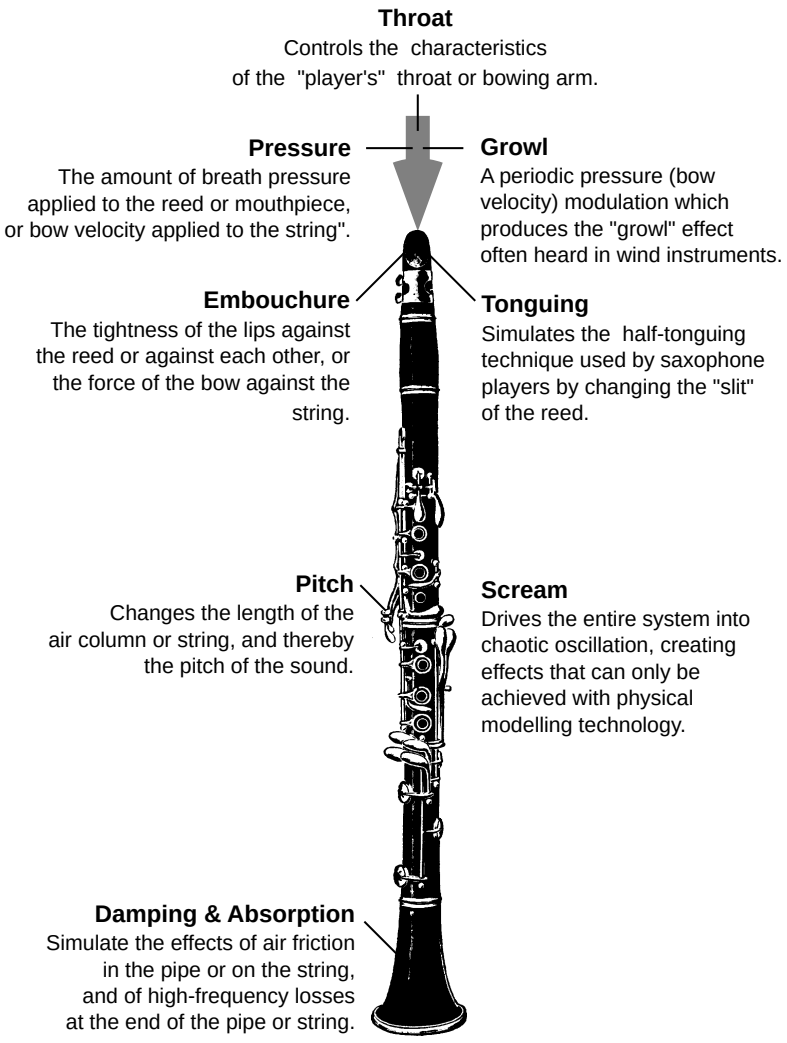
One of the remarkable features of the VL1's Virtual Acoustic Synthesis system is that just about any driver can be used with any type of pipe or string.



● The Controllers

The input to an acoustic instrument comes from the player's lungs, trachea, oral cavity, and lips. In a string instrument it comes from the players arm movement, transmitted to the string via a bow. These elements actually form an important part of the sound generating system and, in the VL1 model, are included in the controllers block. The player also influences the sound of the instrument by playing the keys, tone holes, or frets, and this aspect of control constitutes another part of the controllers block. These and other control parameters provided by the VL1 are listed in the illustration below.

In essence, the controller parameters determine how the instrument "plays". All of these parameters can be assigned to any of the external controllers that can be used with the VL1: breath controller, foot controller, modulation wheels, etc. The *pressure* parameter, for example, will normally be assigned to a breath controller so the player can control the dynamics of the instrument by varying the breath pressure applied to the controller — a natural, instinctive way to play wind-instrument voices. At the same time the *growl* and *throat* parameters might also be assigned to the breath controller in order to achieve life-like response and effects.

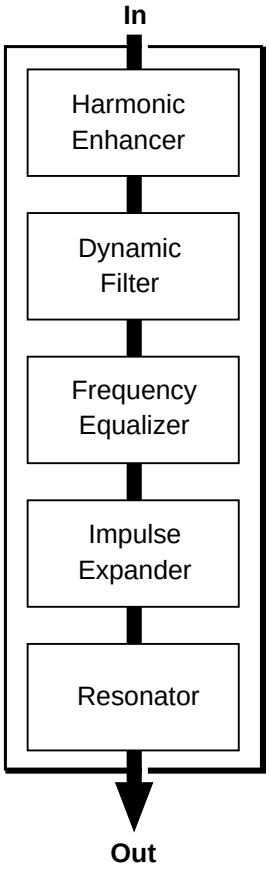


● The Modifiers

Although you don't have direct programming access to the VL1 instrument block, the *modifiers* allow a significant degree of control over the final timbre of the voice. The modifiers block consists of 5 sections as shown in the diagram. Although these may appear to be simple effects, they are actually intimately related to the VL1's sound-producing model and have a significant effect on the sound (the VL1 has a separate effects stage with reverb, delay, and modulations effects — see page 58).

Harmonic Enhancer

The Harmonic Enhancer allows you to manipulate the harmonic structure of the sound to the extent that you can create radical timbral variations within the current instrument "family" (e.g. saxes). *[Page 51]*



Dynamic Filter

This section is similar to the dynamic filters found in many conventional synthesizers. It has selectable high-pass, bandpass, band elimination, and low-pass modes, and a "wet/dry" balance parameter which allows delicate variations in the degree of filtration applied. Another important feature is keyboard cutoff tracking which varies the cutoff frequency according to the key played. *[Page 54]*

Frequency Equalizer

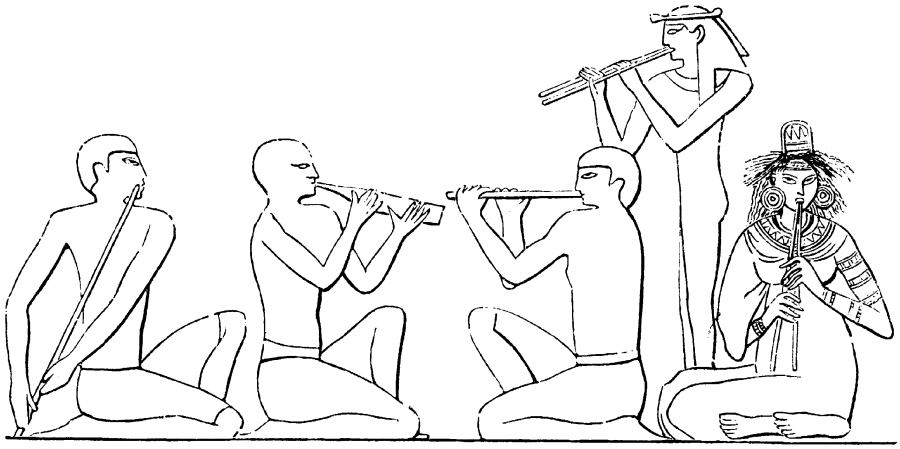
This is a 5-band parametric equalizer with frequency, Q (bandwidth), and level control. The equalizer also has pre-EQ high- and low-pass filters as well as key scaling capability for precise response control throughout the instrument's range. *[Page 55]*

Impulse Expander

The Impulse Expander works in conjunction with the Resonator, described below, to simulate the effect of an instrument's resonant cavity or sound box. It can also be used to simulate the acoustic environment in which the instrument is played. In contrast to the Resonator, the Impulse Expander is more suited to the simulation of metallic resonances and is thus invaluable for refining the sound of brass and metal-bodied woodwinds. Other important effects are the ability to diffuse sharp attack sounds and to give depth and realism to vibrato. *[Page 56]*

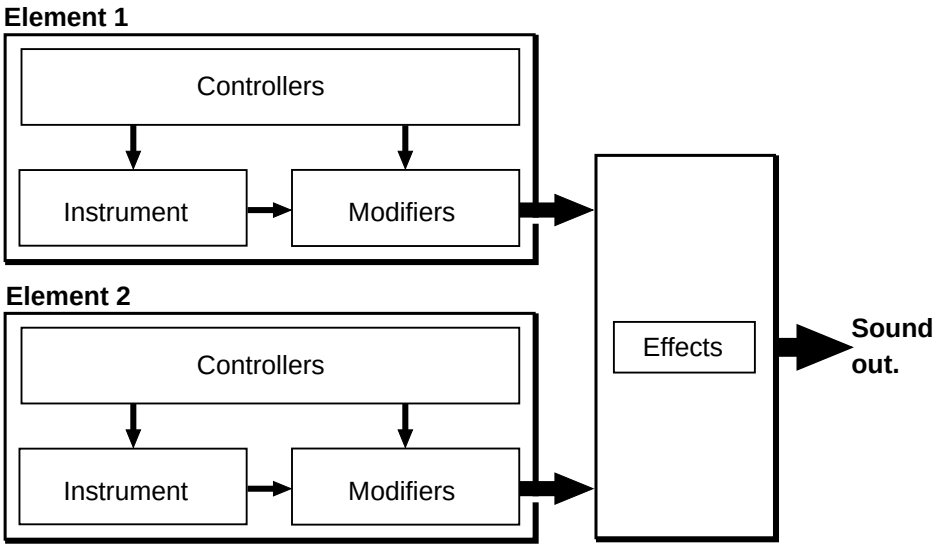
Resonator

While the Impulse Expander and even the Harmonic Enhancer tend to give the sound a metallic quality, the Resonator produces a more woody resonance effect. Careful adjustment of the resonator's parameters can often bring a not-quite-right voice to life. *[Page 57]*



There's More …

In this brief introduction to VL1 basics we've only looked at the central physical model which is the key the VL1's unprecedented sound and musical performance. There's actually much more to it. To begin with the VL1 actually has *two elements* which function as independent physical models. Although it is basically a monophonic solo instrument, this means that the VL1 *can* produce two notes at once. More commonly the two elements are used as *layers* of a single voice.



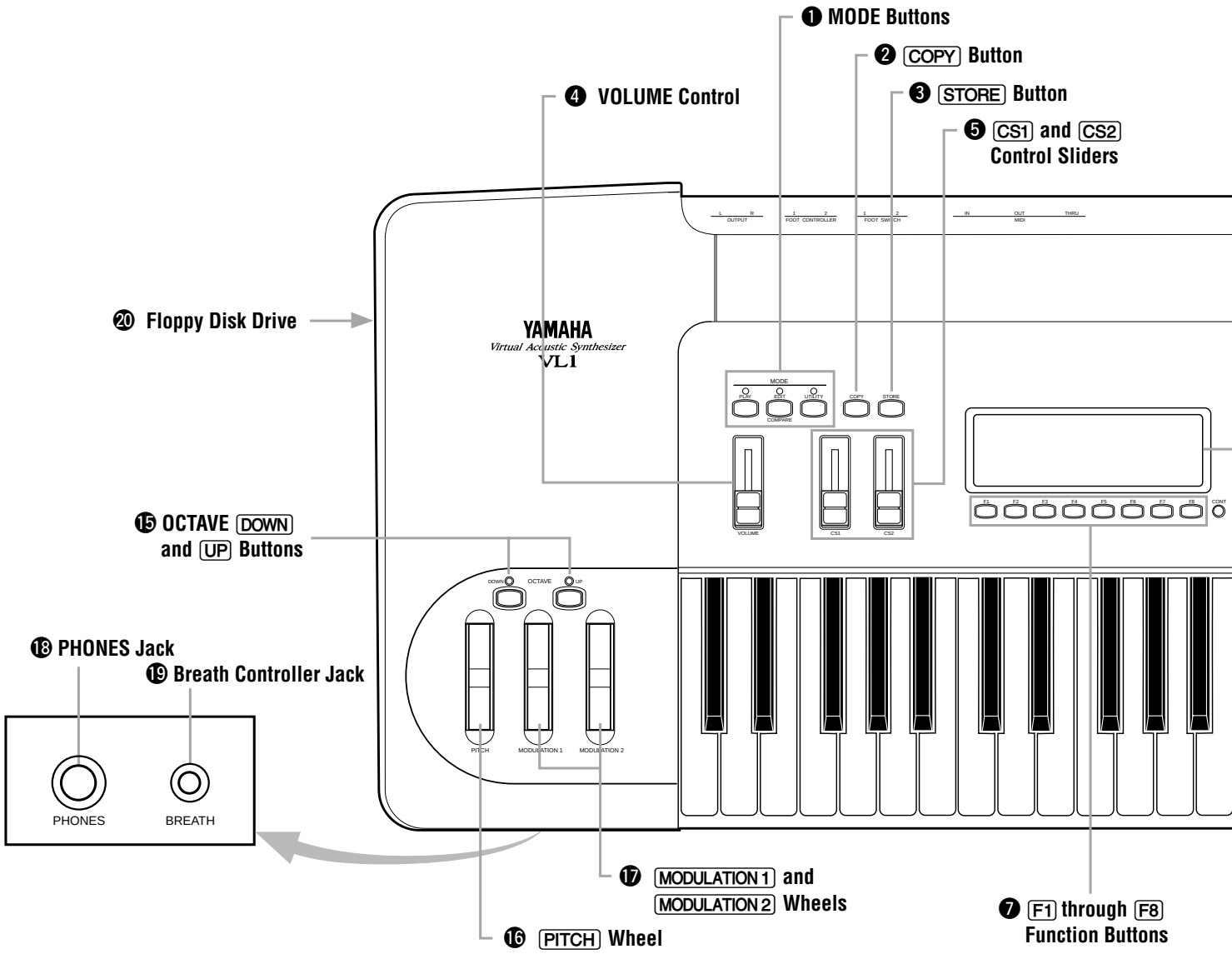
There's also an extensive range of other functions and features that are similar to those you may be familiar with from conventional synthesizers. There are, for example, a range of programmable envelopes that can be applied to most of the controllers in addition to real-time player control. And, of course, there's a comprehensive selection of MIDI, disk, and other utility functions that give the VL1 maximum versatility and convenience.

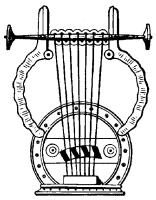
Now that you understand the basics, dive in and find out what the VL1 can really do.

The Controls & Connectors

A Brief Introduction To the VL1 Interface

The following brief descriptions of the VL1 controls and connectors should help you to understand the overall logic of the interface.





Front Panel

❶ MODE Buttons

The [PLAY], [EDIT], and [UTILITY] buttons select the corresponding VL1 modes. The PLAY mode lets you select and play voices, the EDIT mode gives you programming access to the VL1's voice and controller parameters, and the UTILITY mode includes MIDI, disk, system and other functions that are essential for general operation.

❷ [COPY] Button

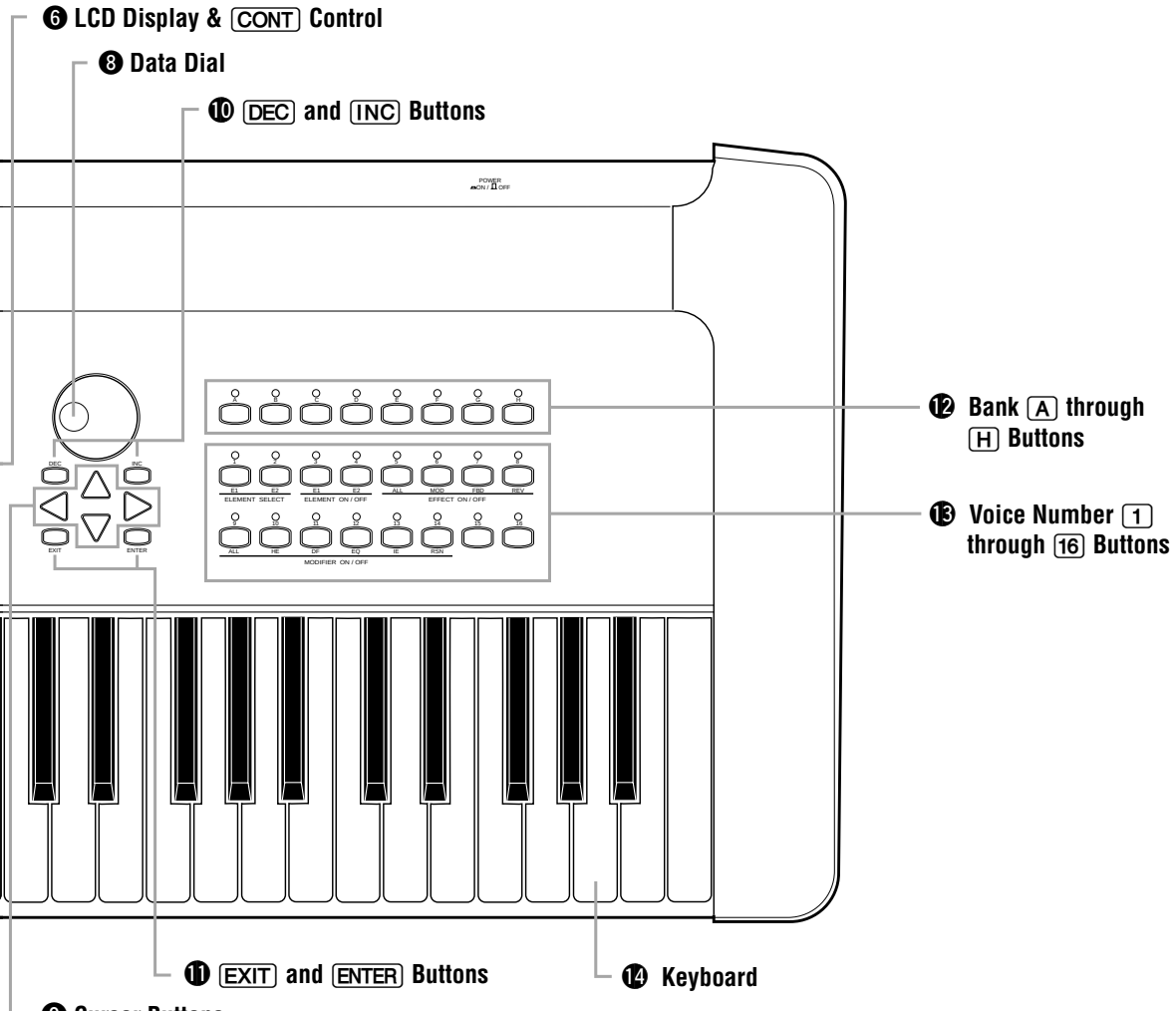
This button is used to copy voice parameters for fast, efficient editing.

☞ *Feature Reference* page 25.

❸ [STORE] Button

Used to store edited data to an internal memory location.

☞ *Feature Reference* page 28.



❹ VOLUME Control

Adjusts the volume of the sound delivered via the rear-panel OUTPUT L and R jacks as well as the PHONES jack.

☛ *Getting Started* page 25.

❺ CS1 and ≠ Control Sliders

These controls can be assigned to a range of controller parameters for real-time expressive control.

☛ *Getting Started* page 47. *Feature Reference* page 19.

❻ LCD Display & ÷ Control

This large multi-function liquid crystal display panel shows all parameters and prompts you need to operate the VL1 with optimum ease and efficiency.

Use the ÷ (contrast) control located near the lower right-hand corner of the display to achieve the best display visibility (LCD visibility varies greatly with viewing angle and lighting).

☛ *Getting Started* page 34. *Feature Reference* page 14.

❼ F1 through F8 Function Buttons

The functions of these buttons depend on the selected mode. They are used to engage a function indicated on the display immediately above the button, select a page of parameters, scroll through a list of parameters, and more.

☛ *Getting Started* page 26. *Feature Reference* page 9.

❽ Data Dial

The data entry dial provides a fast, efficient way to cover a broad range of voice numbers when, for example, you're looking for a voice but don't know the voice number. It's also handy for making large value changes in any of the edit modes.

The data dial is "speed sensitive", allowing accurate single step selection when rotated slowly as well as large value "jumps" when rotated quickly.

☛ *Getting Started* page 35. *Feature Reference* page 16.

❾ Cursor Buttons

These 4 buttons move the "cursor" around the display screen, highlighting the various items that are available for selection or parameters that are available for editing (the VL1 cursor appears as a dark block with inverse characters).

☛ *Getting Started* page 32. *Feature Reference* page 10.

❿ DEC and INC Buttons

Used to select voices and edit parameter values in any of the VL1 edit modes. Either button can be pressed briefly for single stepping in the specified direction, or held for continuous scrolling. These buttons are also used to respond "Yes" or "No" to the "Are you sure?" confirmation prompt when saving, loading data.

☛ *Getting Started* page 35. *Feature Reference* page 16.

⓫ EXIT and ENTER Buttons

The EXIT button can generally be used to exit from any sub-mode or function, while the ENTER button is used to engage a variety of modes and functions.

☛ *Getting Started* page 27. *Feature Reference* page 10.

⓬ Bank [A] through [H] Buttons

The VL1 has 128 internal voice memory locations arranged in 8 banks of 16 voices each. These buttons select the voice bank from which an individual voice will be selected.

☛ *Getting Started* page 35. *Feature Reference* page 15.

⓭ Voice Number [1] through [16] Buttons

The voice number buttons are used in conjunction with the bank buttons to select any of the VL1's 128 internal voice memory locations. When editing voice parameters they are also used to select and mute elements, an to turn effects and modifiers on or off.

☛ *Getting Started* page 35. *Feature Reference* page 15.

⓮ Keyboard

The VL1 has a 49-key keyboard that is both velocity and after-touch sensitive for broad, intimate expressive control.

⓯ OCTAVE [DOWN] and [UP] Buttons

Shift the pitch of the keyboard up or down one octave. A utility "Octave Hold" function (page 153 of the Feature Reference manual) provides two modes: shift only while the button is held, or press once to shift and again to release. MIDI note output data is also shifted.

⓰ π Wheel

This self-centering pitch wheel allows realistic upward and downward pitch bends.

⓱ [MODULATION 1] and [MODULATION 2] Wheels

Can be assigned to any of the VL1's extensive range of controller parameters for extraordinary expressive control.

☛ *Getting Started* page 41.

⓲ PHONES Jack

Accepts a standard pair of stereo headphones (1/4" stereo phone plug) for headphone monitoring of the VL1 sound without the need for external amplification equipment.

☛ *Getting Started* page 23.

⓳ Breath Controller Jack

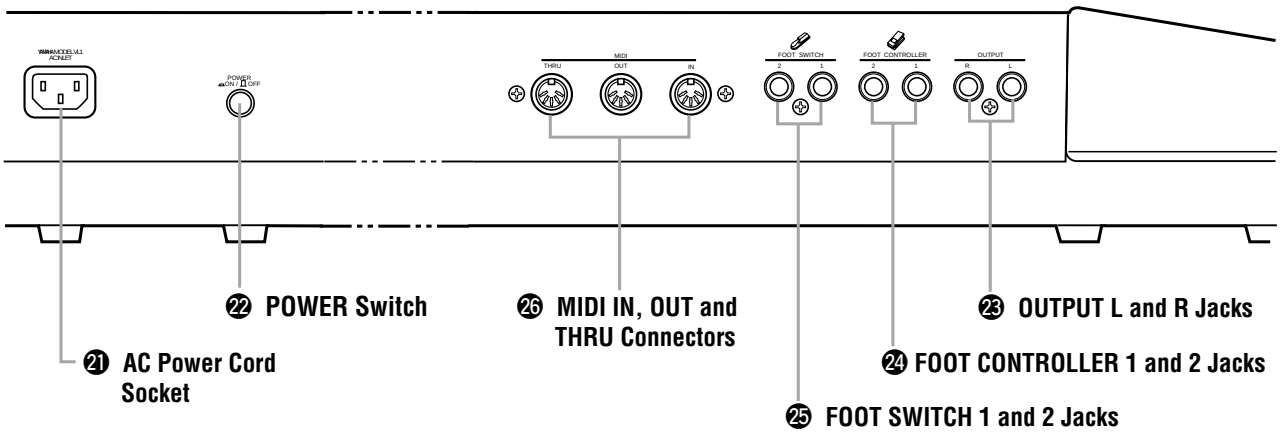
Plug the Yamaha BC2 Breath Controller supplied with the VL1 in here (an optional BC1 Breath Controller may also be used).

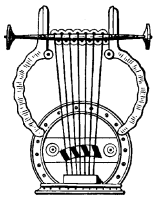
☛ *Getting Started* page 23.

⓴ Floppy Disk Drive

The VL1's built-in floppy disk drive allows easy, economical, high-volume storage of voice data. The disk-in-use indicator below the drive slot lights while any disk operation is in progress (NEVER attempt to remove a disk or turn the power off while a disk operation is in progress). The eject button, also below the disk slot, is used to remove disks from the drive.

☛ *Feature Reference* page 162.





Rear Panel

㉑ AC Power Cord Socket

Be sure to plug the VL1's AC power cord into this socket before plugging the power cord into an AC outlet.

☛ *Getting Started* page 22.

㉒ POWER Switch

Press to turn power ON or OFF.

㉓ OUTPUT L and R Jacks

These are the main stereo outputs from the VL1. Be sure to connect both outputs to the appropriate channels of a stereo sound system in order to appreciate the full quality of the VL1 sound and effects.

☛ *Getting Started* page 24.

㉔ FOOT CONTROLLER 1 and 2 Jacks

These jacks accept Yamaha FC7 Foot Controllers which can be used to control any of the VL1's controller parameters. One FC7 Foot Controller is supplied with the VL1, and this should normally be plugged into the FOOT CONTROLLER 2 jack. The second FC7 foot controller is optional.

☛ *Getting Started* page 23.

㉕ FOOT SWITCH 1 and 2 Jacks

An optional Yamaha FC4 or FC5 footswitch can be connected to one or both of these jacks for sustain, portamento, and other control functions.

☛ *Getting Started* page 23.

㉖ MIDI IN, OUT and THRU Connectors

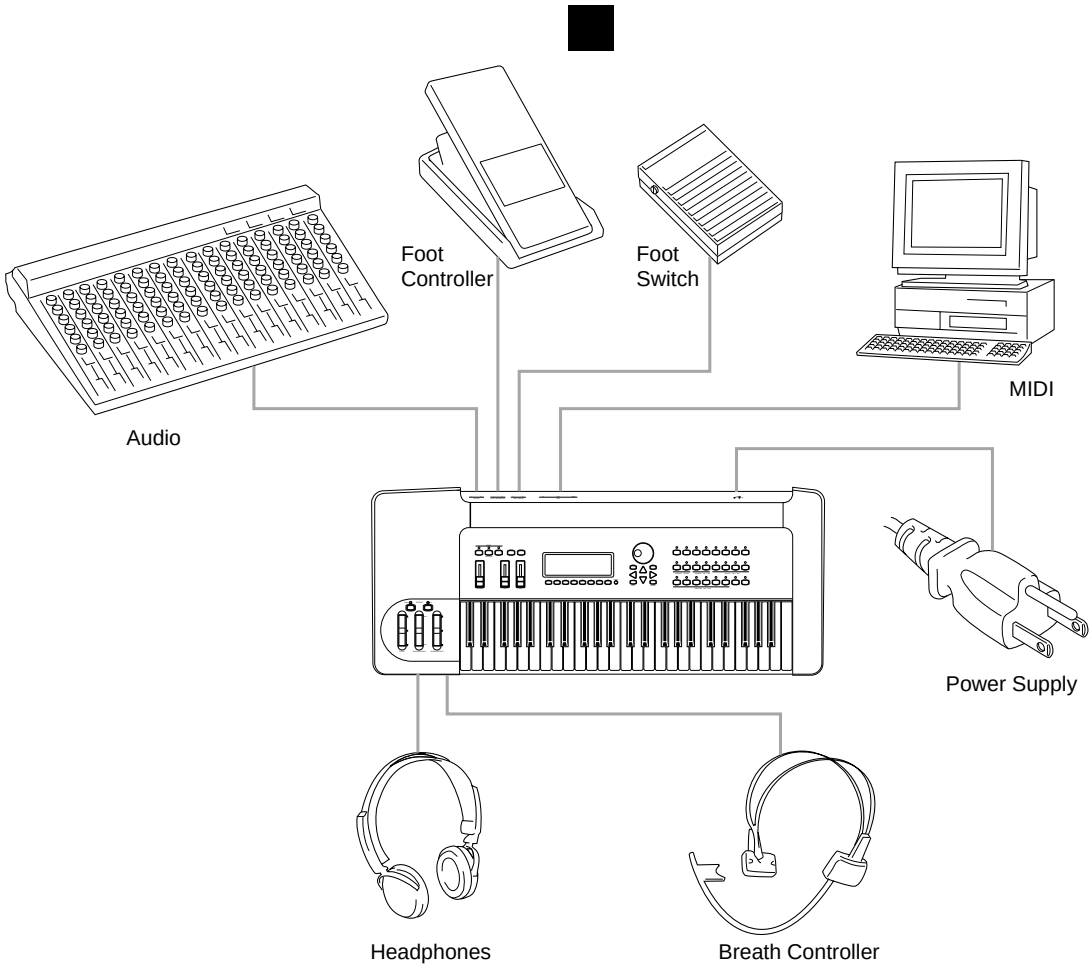
The MIDI IN connector receives the data from an external sequencer or other MIDI device which is to control or transmit data to the VL1. The MIDI THRU connector simply re-transmits the data received at the MIDI IN connector, allowing convenient chaining of MIDI devices. The MIDI OUT connector transmits data corresponding to all VL1 performance operations, or bulk data when one of the MIDI data transmission functions are activated.

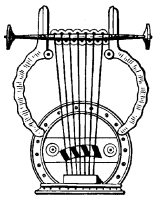
☛ *Getting Started* page 24.



Setting Up

System Connections & Preparation





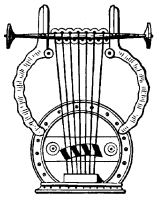
Power Supply

Before making any other connections the “female” end of the AC power cord supplied with the VL1 should be firmly plugged into the rear-panel AC cord socket. Ideally the power cord should then be plugged into a convenient AC outlet after you’ve made all other necessary connections and placed the VL1 in the position in which it will be used. Always make sure that the POWER switch is in the OFF (extended) position before plugging the power cord in an AC outlet.



CAUTION!

CAUTION! ■ *Make sure your VL1 is rated for the AC voltage supplied in the area in which it is to be used (as listed on the rear panel). Connecting the VL1 to the wrong AC supply can cause serious damage to the internal circuitry and may even pose a shock hazard!*



Controllers

● Breath Controller

The Breath Controller is an essential expressive tool — both for realistic expression with wind-instrument voices and unprecedented expressive control with string voices. Plug the BC2 Breath Controller supplied with the VL1 (or an optional BC1 breath controller) into the front-panel breath controller jack. The Breath Controller is ideal for controlling parameters that would normally be affected by a wind player's breath: dynamics, timbre, pitch, and others.

Once you've set up your system and begin playing, refer to "Breath Controller Calibration" on page 29 for instructions on calibrating your Breath Controller for optimum control precision and ease.

NOTES ■ *For more information on Breath Controller setup and operation, see the instructions packed with the supplied BC2 Breath Controller.*

● Foot Controllers

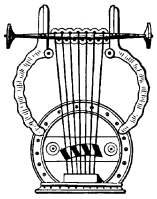
Although the VL1 has jacks for two foot controllers, it is not necessary to use both. To begin with plug the supplied FC7 Foot Controller into the rear-panel FOOT CONTROLLER 2 jack.

If you purchase a second FC7 Foot Controller for extra control capability, plug it into the FOOT CONTROLLER 1 jack.

NOTES ■ *For more information on Foot Controller setup and operation, see the instructions packed with the supplied FC7 Foot Controller.*

● Foot Switches

The use of one or two footswitches allows sustain, portamento, and mono/poly mode switching. We recommend that you purchase at least one Yamaha FC4 or FC5 Footswitch for this purpose. A single footswitch can be plugged into either the rear-panel FOOTSWITCH 1 or 2 jack.



Audio Connections

● Headphones

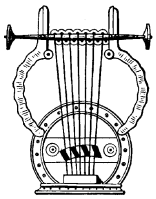
For private listening and practice headphones are ideal. You don't have to hook up and complete sound system, and you won't disturb the neighbors no matter how loud or late you play. Recommended Yamaha headphones for VL1 monitoring are the HPE-170, HPE-160, or HPE-150 Stereo Headphones. Any standard pair of stereo headphones with a 1/4" stereo phone plug and an impedance of between about 8 and 150 ohms can be used.

● Stereo Sound System

The VL1 voices and effects are designed to sound their best in stereo, so you should always use a stereo sound system to appreciate the full impact of the VL1 voices and expressive features. The VL1 OUTPUT L and R jacks can be connected directly to musical instrument amplifiers designed for keyboard use, or to the line inputs of a mixing console. It is also possible to connect the VL1 outputs directly to the inputs of a multitrack or stereo tape recorder.

NOTES ■ *If you need to drive a mono amp or other device the VL1 output can be switched to mono — the same signal appears at the L and R outputs — by using the Output parameter described on page 154 of the Feature Reference manual.*

■ *Make sure that both the VL1 and your sound system are turned OFF when making connections.*



MIDI Connections

Like any other MIDI instrument the VL1 can be used with MIDI tone generators, sequencers, computer software, and controllers for virtually unlimited system expansion and control capability. You might, for example, like to control it from a Yamaha wind controller such as the WX11 rather than the keyboard for even more realistic wind-instrument feel and expression.

To ensure reliable error-free transmission of MIDI data always use high-quality MIDI cables obtained from your Yamaha dealer or music equipment store. Also avoid MIDI cables that are longer than about 15 meters, since cables longer than this can pick up noise which can cause data errors.

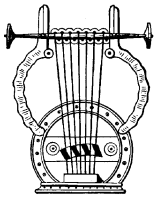
The VL1 MIDI transmit channel, receive channel, local on/off, and device number parameters are available in the utility mode “MIDI Setting” page described on page 155 of the Feature Reference manual. Make sure these parameters are set to match the corresponding settings of the external MIDI device(s) used with the VL1.

● The VL1 transmits and receives the following MIDI data:

Note	The played key(s) and velocity value.
Control Change	Modulation wheel, foot controller, breath controller, and other controller data.
Program Change	Voice numbers from 1 to 128.
Aftertouch	Keyboard aftertouch pressure.
Pitch Bend	Pitch bend wheel position.
Bulk	Voice and system parameters transmitted in the form of “bulk dumps”.

NOTES ■ *For detailed MIDI specifications refer to the "MIDI Data Format" .*

■ *When using the VL1 with other MIDI equipment, it is a good idea to refer to the MIDI specifications (implementation chart, MIDI data format) of the equipment used to ensure compatibility.*



Power-on Procedure

Always follow proper procedure when powering-up a sound system to minimize the possibility of damage to the equipment (and your ears!).

1. Make sure your sound system's main level/volume control(s) and the VL1 volume control are turned all the way down prior to turning power on.

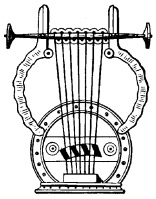
2. Turn on the VL1.

3. Turn on the sound system.

4. Raise the sound system volume to a reasonable level.

5. Gradually raise the VL1 VOLUME control while playing the keyboard to set the desired listening level.

NOTES ■ *The VL1 automatically transmits MIDI control change data corresponding to its control status when its power switch is turned ON or OFF. This can interfere with operation of other MIDI equipment connected to the VL1 MIDI OUT connector. If the VL1 is connected to other MIDI equipment, the VL1 power switch should be turned ON first, and turned OFF last.*



Play the Demo

Once you've set up your VL1 system, you might like to play the pre-programmed demo sequence to hear how some of the voices sound. This process will also help to familiarize you with some of the VL1's selection and editing procedures.

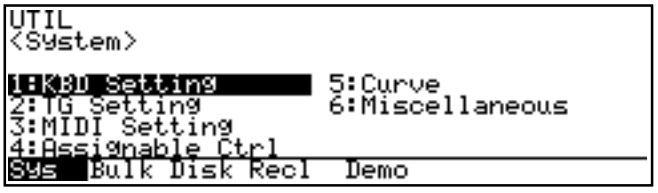


IMPORTANT!

IMPORTANT! ■ *When you run the demo the VL1 automatically loads the required voices and system data into the 16 bank-H voices, thus erasing any previous data in these memory locations. This is the same as the data initially contained in these memory locations when the VL1 is first shipped, so if you haven't made any changes there is no problem. If, however, you have edited the bank-H data or saved data from another bank or disk to this bank, you may want to save your data to floppy disk before running the demo.*

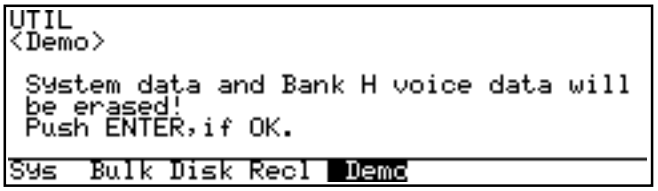
1. Select the Utility Mode System Page

Press the UTILITY button to select the utility mode. Then, if it is not already selected when the utility mode display appears, press the F1 button to select the "System" function page.



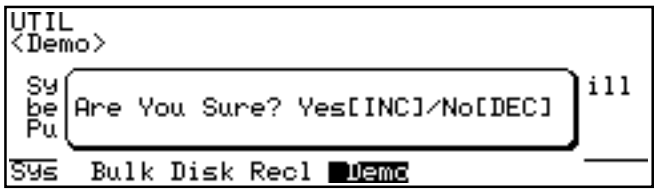
2. Select the Demo Page

Press the ∞ button to select the "Demo" page.



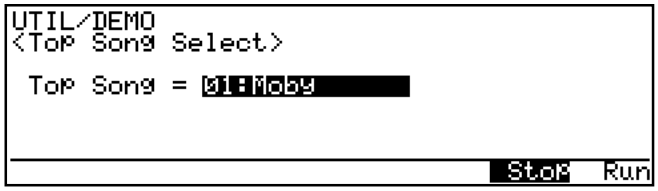
3. Press [ENTER] and Confirm

Press the [ENTER] button if it's OK to go ahead with the demo — and rewrite all bank-H data. The VL1 will ask you to confirm again: press [INC] to continue or [DEC] to abort.



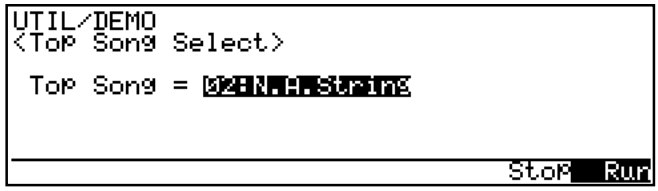
4. Select a Song

Use the data dial or [DEC] and [INC] buttons to select the song number you want to start with.



5. Run the Demo

Press the [F8] button to run the demo. Playback will start with the selected song, then all other songs will be played in sequence. The cycle will repeat until stopped.



6. Stop the Demo

Press the F7 button to stop demo playback.

7. Return To the Play Mode When Done

Press the MODE PLAY button to return the PLAY mode.

Breath Controller Calibration

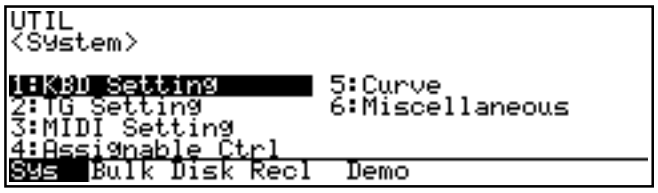
Proper operation of the breath controller is vital to achieving the best possible sound from the VL1. Although the controller is factory-calibrated to match most requirements, we recommend that you carefully calibrate the breath controller for optimum performance with your own playing style.

1. Make Sure the Breath Controller Is Connected

Make sure the breath controller is properly connected: turn the power OFF, plug in the breath controller, then turn the power ON.

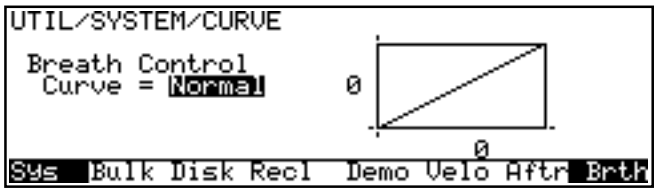
2. Select the Utility Mode System Page

Press the [UTILITY] button to select the utility mode. Then, if it is not already selected when the utility mode display appears, press the [F1] button to select the "`System`" function page.



3. Go To the Utility Mode Curve Page and Select "Brth"

Use the cursor buttons to move the cursor to "`5:Curve`", then press [ENTER] to call the "`Curve`" function page. When the curve display appears press the [F8] function button ("`Brth`") to call the breath controller curve page.



4. Adjust the Breath Controller Offset

The following adjustment must be performed while not blowing into the breath controller mouthpiece. Do not hold the breath controller in your mouth.

Rotate the breath controller OFFSET trimmer slowly clockwise, using the supplied screwdriver, until the vertical cursors above and below the curve graph move slightly to the right and the number below the graph is greater that "0". Then slowly rotate the trimmer carefully counter-clockwise until the number below the graph just reaches "0" (the cursors will be lined up with the left end of the graph), then stop. This completes the offset adjustment.

5. Adjust the Breath Controller Gain

Place the breath controller mouthpiece in your mouth and blow — notice that the cursors move to right and the number below the graph increases according to how hard you blow. Rotate the breath controller GAIN trimmer counter-clockwise as far as it will go (don't force it!) then, while blowing into the mouthpiece using the maximum pressure you intend to use while playing, rotate the trimmer slowly clockwise until the number below the graph just reaches "127" (the cursors should just line up with the right end of the graph) and then stop. This completes the gain adjustment.

> **NOTES** ■ *In addition to calibrating the breath controller, the UTILITY mode "Curve" page described here also allows you to select a range of 4 different response curves — these are discussed in more detail on page 157 of the Feature Reference manual.*

6. Return to the Play Mode

Press the [PLAY] button to return to the PLAY mode.

Load the Pre-programmed Voice Data

Although the factory pre-programmed voices, performance combinations, and patterns are stored in the VL1 internal memory when the instrument is initially shipped, there is always a possibility that all or part of the memory has been erased or modified by the time the instrument gets to you. Here's how you can re-load all the pre-programmed data from the supplied voice disk.

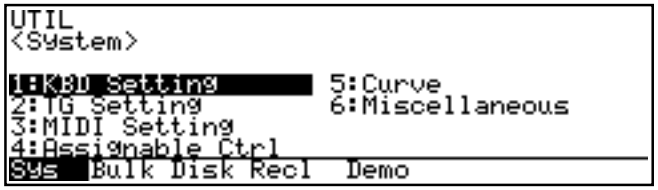
NOTES ■ *Loading the pre-programmed voices overwrites any other data that is in the VL1 internal memory, so if you have any important voices in memory make sure it is safely stored to disk before loading the data — Feature Reference manual, page 166.*

1. Insert the Voice Disk

Insert the voice disk into the disk drive. The sliding disk shutter should go in first, and the label side of the disk should face upward.

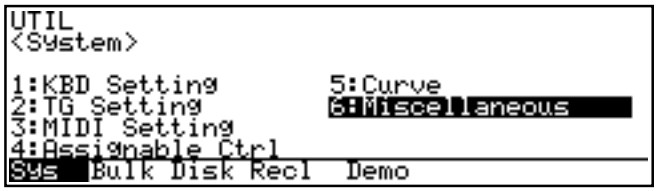
2. Select the Utility Mode System Page

Press the [UTILITY] button to select the utility mode. Then, if it is not already selected when the utility mode display appears, press the [F1] button to select the "`System`" function page.

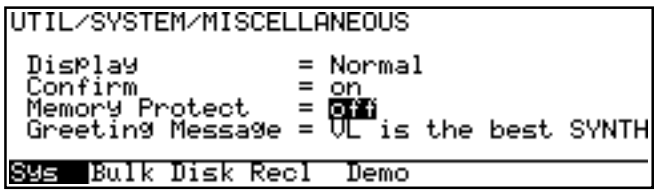


3. Go To the Miscellaneous Page & Turn Memory Protect Off

Use the cursor buttons to move the cursor to "`6:Miscellaneous`", then press [ENTER] to call the "`Miscellaneous`" function page.



Use the cursor buttons to select the "`Memory Protect`" parameter, then press [DEC] to turn memory protect "`off`".



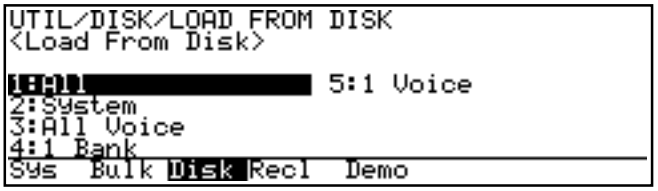
4. Select the Disk Function Directory

Press the F3 function button ("Disk") to select the utility mode disk function directory.



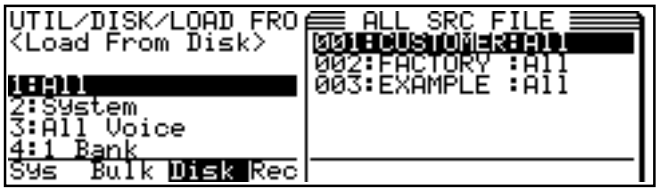
5. Select "Load From Disk"

Use the cursor buttons to move the cursor to "2:Load From Disk" and then press ENTER.

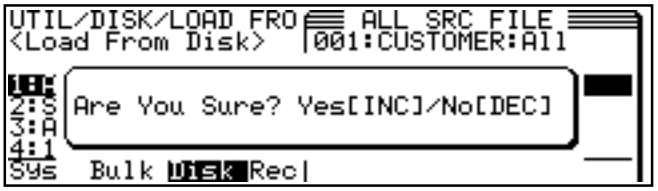


6. Select "All" and Select the "CUSTOMER:All" File

Make sure the cursor is positioned at "1:All" and press ENTER.



When the list of files appears use the cursor ▲ and ▼ buttons to select the "CUSTOMER:All" file, then press ENTER again.



7. Load the File

Loading will begin when you press the INC button in response to the "Are You Sure?" prompt. A bar graph on the display will indicate the progress of the load operation, and when all the data has been loaded "Completed!" will appear.



8. Return to the Play Mode & Eject the Disk

When the "Completed!" display appears, press the PLAY button to return to the play mode, then press the eject button below the disk drive slot to eject the disk. Store the disk in a safe place. You must now select a voice in order for the loaded data to be properly activated — see the following section.

About the VL1 Data Disk

The floppy disk supplied with the VL1 contains the following files:

● CUSTOMER:ALL

A complete set of 128 voices and system data in which the voices are programmed to allow maximum controller variation. The MODULATION 2 wheel should be at its center position for "normal" sound.

● FACTORY:ALL

A complete set of 128 voices and system data in which the voices are programmed for easy playability — the controller range is not as broad as the CUSTOMER.ALL voices.

● EXAMPLE:ALL

Some example voices in which the controller settings are emphasized.

Voice Selection

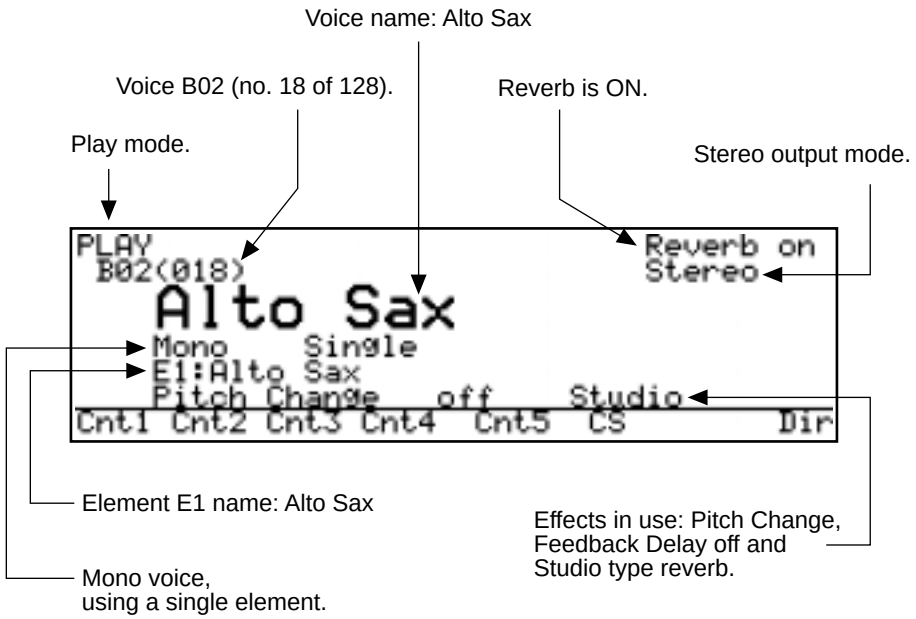
Selecting & Playing the VL1's 128 Voices

One of the first things you'll want to do with your VL1 is select and play some of its voices … this section will show you how to do just that.

1. Select the Play Mode

Press the PLAY button so that its indicator lights and the word "PLAY" appears in the upper left corner of the LCD panel.

A considerable amount of information appears on the play-mode display in addition to the name of the currently selected voice. Many of the functions relating to this information will be covered later in the manual. For now, here are the basics:



The abbreviations in the section separated by a line at the bottom of the display ("Cnt1", "Cnt2", etc) indicate the functions of the corresponding function buttons below the display: F1 through F8. These will be discussed later in this section.

2. Select a Voice

The VL1's 128 voices are organized into 8 banks of 16 voices each (8 x 16 = 128). Any voice can be selected by specifying its bank using the bank buttons (A through H), and its number using the voice number buttons (1 through 16).

To select voice "B2", for example, first press the bank B button and then the voice number 2 button. The bank B button indicator will flash until the voice number 2 button is pressed and the B2 voice is actually engaged.

Note that when you select a different bank (or even press the current bank button) the voice directory for the selected bank will appear on the display, showing the names of all voices in that bank with the cursor located at the currently selected voice number. The VL1 returns to the normal voice display as soon as you specify the voice number. You can also press the ENTER button if you want to stay with the same voice number.



To select a different voice within the same bank it is only necessary to press the appropriate voice number button. To select a different bank, however, you'll always have to press both a bank button and a voice number button (or the ENTER button). This prevents unwanted voices from being selected until you've actually specified both the bank and number of the voice you want to use.

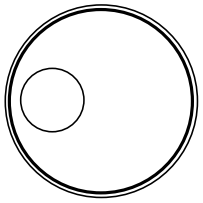
Alternate Voice Selection Methods

● **The INC and DEC Buttons** are best used for small, step-wise changes — e.g. selecting adjacent voice numbers, or numbers that are only a few steps away.



Press the DEC or INC button briefly to decrement or increment the voice number by one, or hold either button for continuous decrementing or incrementing in the corresponding direction. The bank will switch automatically if you cross a bank voice-number boundary.

● **The Data Dial** provides a fast, efficient way to cover a broad range of voice numbers when, for example, you're looking for a voice but don't know the voice number. Simply rotate the data dial clockwise for higher voice numbers or counter-clockwise for lower voice numbers while watching the display.

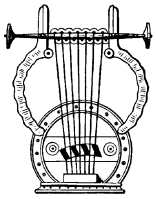


The banks are automatically switched when necessary as the voice numbers are changed.

3. Play

Try playing the selected voice on the keyboard. Select a number of different voices and try them out. You will have to apply breath pressure to the breath controller, press the foot controller forward, or roll the [MODULATION 2] wheel upward to produce sound with many of the VL1's voices. A complete list of the pre-programmed voices and their controller assignments is provided in the Voice List & MIDI Data Format. A brief voice list is provided below. The VL1 also provides "controller views", described in the next chapter, that let you check the current controller assignments via the VL1 display.

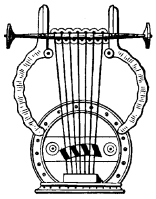
NOTES ■ *If you don't get any sound at this point: Make sure your sound system is turned ON and the volume is turned up to a reasonable level, make sure that the VL1 VOLUME control is turned up to a reasonable level, and check all connections carefully.*



Using the Voice Directory

Although the voice directory appears automatically any time you select a different bank, you can have the directory displayed continuously if you find it more convenient than the normal voice display. To switch to the voice directory display, press the [F8] button — located directly below "`Dir`" on the display. Voices are selected using the same methods described in the preceding section, and the cursor buttons or data dial will move to the selected voice.

To return to the normal voice display press the [EXIT] button.



The Pre-programmed VL1 Voices

Here's an abbreviated voice list for easy reference.

Voice No.	Voice Name	Voice No.	Voice Name	Voice No.	Voice Name	Voice No.	Voice Name
A01 (001)	Moby	C01 (033)	Gonzilla	E01 (065)	Dr.Bonky	G01 (097)	Lees
A02 (002)	Tenor Sax	C02 (034)	Soprano 1	E02 (066)	Bell Miked	G02 (098)	Breath Sax
A03 (003)	Shakuhachi	C03 (035)	MouthKeys	E03 (067)	Blues Harp	G03 (099)	Bowed Saw
A04 (004)	FingerBass	C04 (036)	Thump Bass	E04 (068)	Slap Bass	G04 (100)	Birdland
A05 (005)	Trumpet	C05 (037)	Cornet	E05 (069)	Muted Lips	G05 (101)	Fanfare
A06 (006)	Ossyncro	C06 (038)	Igneous	E06 (070)	Analunar	G06 (102)	Chalsaw
A07 (007)	Tull Flute	C07 (039)	Alto Flute	E07 (071)	Andean	G07 (103)	Recorder
A08 (008)	Bagpipes	C08 (040)	Khaen	E08 (072)	Sitar	G08 (104)	Harmonium
A09 (009)	GuitarHero	C09 (041)	Cruncher	E09 (073)	Rock Pigs	G09 (105)	WonderBass
A10 (010)	Mizu Horne	C10 (042)	Marsaloboe	E10 (074)	Synth Lite	G10 (106)	NuDblReed
A11 (011)	Viol Inn	C11 (043)	Eleanor	E11 (075)	St. Ripper	G11 (107)	Viowind
A12 (012)	Endophone	C12 (044)	RichReed	E12 (076)	Scat Harp	G12 (108)	Harmoweird
A13 (013)	JetLipBow	C13 (045)	Breath Bow	E13 (077)	L7 Pluck	G13 (109)	Cyberpluck
A14 (014)	BowBamBoo	C14 (046)	SquealerAT	E14 (078)	Flak	G14 (110)	NuAltoPipe
A15 (015)	Bassoon	C15 (047)	Oboe	E15 (079)	3 AM Blow	G15 (111)	Gerhard
A16 (016)	Digeritek	C16 (048)	Maysbe?	E16 (080)	Yamasteel	G16 (112)	Mad Tube
B01 (017)	Backwards	D01 (049)	BlownDrone	F01 (081)	MoreGrunge	H01 (113)	AcoEkoSyn
B02 (018)	Alto Sax	D02 (050)	Loose Bari	F02 (082)	Soprano 2	H02 (114)	LooseTenor
B03 (019)	Pan Pipes	D03 (051)	Toots	F03 (083)	Ocarina	H03 (115)	Kokyu
B04 (020)	MelodyBass	D04 (052)	Fretless	F04 (084)	Upright	H04 (116)	Tube Bass
B05 (021)	Horn	D05 (053)	Tuba	F05 (085)	Alto&Trump	H05 (117)	TrumpCard
B06 (022)	50 / 50	D06 (054)	Arpoon	F06 (086)	OldMini	H06 (118)	PipeBowBow
B07 (023)	C Flute	D07 (055)	Piccolo	F07 (087)	Fyfe	H07 (119)	BaroquePad
B08 (024)	HurdyGurdy	D08 (056)	Thai Reed	F08 (088)	Squeezebox	H08 (120)	Outback
B09 (025)	JazzGuitar	D09 (057)	Frange	F09 (089)	Mr. Mogue	H09 (121)	FuzzyBass
B10 (026)	Harmophone	D10 (058)	NuSoprPipe	F10 (090)	HyperClari	H10 (122)	Wheed
B11 (027)	Fiddler	D11 (059)	Contraire	F11 (091)	DoubleBow	H11 (123)	Monteverdi
B12 (028)	Floboe	D12 (060)	ClariLip	F12 (092)	RuffWreck	H12 (124)	Sax Git
B13 (029)	Yhokihi	D13 (061)	Conchise	F13 (093)	Clavisynth	H13 (125)	Cyberisen
B14 (030)	BlueBottle	D14 (062)	Pastorale	F14 (094)	Claricord	H14 (126)	Clar&Flute
B15 (031)	Clarinet	D15 (063)	Barker	F15 (095)	TrumpNSax	H15 (127)	Saxes
B16 (032)	Jurassic	D16 (064)	FrenchBone	F16 (096)	QuiScivit?	H16 (128)	Isn't Wah

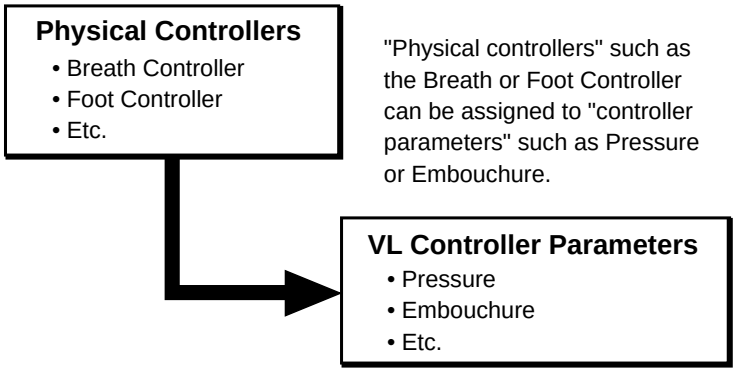
A more detailed voice list is provided in the Voice List & MIDI Data Format.

The Controllers

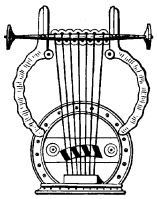
Natural Musical Nuance and Expressive Control

If you've read the "VL1 Basics" section (if you haven't, please do so — page 8) you should understand the concept of "controllers" as applied to the VL1. The "controller parameters" correspond to simulated characteristics of the instrument model — e.g. breath pressure, embouchure or tonguing. Any of these can be controlled by you via "physical controllers" — e.g. the breath controller or modulation wheel — assigned to the required controller parameter. Even if you never go as far as editing the actual sound of the voices, you'll no doubt want to be able to change these controller assignments and modify the way the controllers affect the sound.

In this section we'll introduce you to the basics of controller assignment and operation.



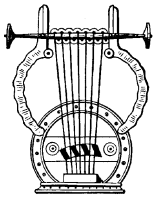
The effectiveness of the VL1 as a musical instrument depends to a great deal on how well you learn to use these controllers. Since the VL1 sound is produced by a computer-based physical model rather than a oscillator-based tone generator, there are no hard-and-fast rules as to how any controller will actually affect the sound. There are guidelines, based on the role of the corresponding controller parameter within the physical model, but proficiency with the VL1 depends more on experience and practice — just as it does in any acoustic instrument.



Physical Controllers

First, here's a list of the physical controllers available for use with the VL1:

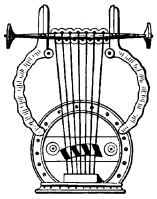
Breath Controller	A natural candidate for controlling pressure, tonguing, throat, growl, and other parameters.
Breath Attack	This unique "controller" can be applied only through the Breath Controller. When it is selected control is applied by *changes* in breath pressure, rather than the absolute breath pressure itself. A constant pressure — whether zero or maximum — produces no change. The faster the change in pressure, the higher the control value.
Pitch Wheel	The self-centering VL1 pitch wheel can be assigned to a range of parameters, but it's "standard" function is pitch control. A controller parameter such as Embouchure can also be assigned to the pitch wheel for more realistic pitch variations.
Modulation 1 Wheel	This wheel produces minimum effect in its lowest position and maximum effect in the highest position. This modulation wheel is permanently assigned to the standard MIDI modulation wheel control change number — 001.
Modulation 2 Wheel	The VL1's second modulation is not self-centering, but it has a center click-stop which makes it ideal for assignment to parameters that have a "normal" central setting with variations above and below. It can also be assigned to any MIDI control change number, function in the same way as the breath controller, foot controller, etc.
Foot Controller 1	Foot controller 1 has the standard MIDI foot controller control change number — 004 — and can be assigned to any VL1 controller parameter.
Foot Controller 2	Like the modulation 2 wheel, foot controller 2 is assignable to any MIDI control change number, and is frequently assigned to function in the same way as the breath controller. It can also be assigned to any VL1 controller parameter.
Foot Switches 1 & 2	In addition to their obvious sustain and portamento functions, the foot switches are independently assignable to any MIDI controller function as well as a voice number increment function. Of course, they are only really useful with on/off type parameters — not with parameters that allow continuous control.
Aftertouch	Keyboard aftertouch allows you to control any controller parameter by the pressure you apply to a key after it is initially pressed. This is perhaps the most "intimate" type of keyboard expression control.
Velocity	Although normally assigned to pressure (particularly in plucked string voices), keyboard velocity can also be assigned to any other controller parameter.
MIDI	The MIDI protocol provides 119 control change numbers, some of which are pre-assigned to specific controllers — "001" is "Modulation Wheel", for example. All of these are available for assignments to the VL1 controller parameters, so external MIDI control devices can be used to full advantage.



VL1 Controller Parameters

Any of the physical controllers listed above can be assigned to control any of the VL1's controller parameters:

Pressure	The amount of breath pressure applied to a reed or mouthpiece, or the speed of the bow applied to a string. Pressure variations affect both volume and timbre.
Embouchure	The tightness of the lips against the reed or against each other. In a string instrument voice Embouchure corresponds to how strongly the bow is pressed against the string. Affects both pitch and timbre.
Pitch	Changes the length of the air column, and thereby the pitch of the sound. The PITCH wheel is usually assigned to this parameter.
Vibrato	A standard vibrato (pitch modulation) effect. An extensive range of parameters makes it possible to achieve extremely natural vibrato effects. The amounts of vibrato applied via pitch and embouchure, for example, are independently programmable.
Tonguing	Simulates the half-tonguing technique used by saxophone players by changing the "slit" of the reed. The slit is the space between the tip of the reed and the mouthpiece.
Amplitude	Unlike Pressure, this parameter simply controls the volume of the sound without varying timbre.
Scream	Drives the entire system into chaotic oscillation, creating effects that can only be achieved with physical modeling technology.
Breath Noise	Adds breath noise. The sound of the breath noise itself can be varied over a wide range using the EDIT mode "Breath Noise" parameters — Feature Reference manual page 73.
Growl	A periodic pressure modulation which produces the "growl" effect often heard in wind instruments. Like vibrato, an extensive range of parameters allow remarkably realistic effects.
Throat Formant	Controls the characteristics of the simulated player's lungs, trachea, and oral cavity. Can add a realistic "roughness" to the sound.
Dynamic Filter	Similar to the dynamic filters found in many conventional synthesizers. The VL1 filter has selectable high-pass, bandpass, band elimination, and low-pass modes.
Harmonic Enhancer	The Harmonic Enhancer can vary the harmonic structure of the sound over a wide range. The Harmonic Enhancer also includes parameters that affect breath noise and several reed characteristics.
Damping	Simulates the effect of damping at the end of the air column or string. Affects both pitch and timbre.
Absorption	Similar to the above, but simulating the effect of absorption at the end of the air column or string. In the case of a wind instrument, the Damping and Absorption parameters control the diameter and shape of the bell.



Controller Views

In the PLAY mode, function buttons F1 through F6 are used to select "controller view" displays that list all controller assignments for the currently selected voice. In particular, F1 through F4 display the assignments for the controller parameters listed in the preceding chart (you can press the EXIT button at any time to return to the normal play-mode display).

F1

```
PLAY/CONTROLLER VIEW 1
 B02(018):Alto Sax
                 Element1
Pressure         Breath Cor
Embouchure       Pitch Bend
Pitch            Pitch Bend
Vibrato          Modulation
Cnt1 Cnt2 Cnt3 Cnt4 Cnt5 CS        Dir
```

F2

```
PLAY/CONTROLLER VIEW 2
 B02(018):Alto Sax
                 Element1
Tonguing         Foot Contr
Amplitude        off
Scream           off
Breath Noise     Velocity
Cnt1 Cnt2 Cnt3 Cnt4 Cnt5 CS        Dir
```

F3

```
PLAY/CONTROLLER VIEW 3
 B02(018):Alto Sax
                 Element1
Growl            off
Throat Formant   After Touc
D.Filter         Breath Con
H.Enhancer       Velocity
Cnt1 Cnt2 Cnt3 Cnt4 Cnt5 CS        Dir
```

F4

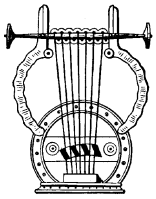
```
PLAY/CONTROLLER VIEW 4
 B02(018):Alto Sax
                 Element1
Damping          off
Absorption       off

Cnt1 Cnt2 Cnt3 Cnt4 Cnt5 CS        Dir
```

The controller parameters are listed in the left column of the controller view display, and the controllers assigned to them are listed in the center column. Note that the right column is empty. This is because the AltoSax voice used for this example only uses one element, so the controllers are listed in the central "`Element1`" column. In a voice that uses two elements the "`Element2`" controllers are independently assignable and are listed in the right column.

In this example we can see that the breath controller is assigned to control "`Pressure`" and "`H.Enhancer`" (the Harmonic Enhancer). The pitch wheel controls both "`Pitch`" and "`Embouchure`", and the modulation wheel (MODULATION 1) controls "`Vibrato`". Keyboard aftertouch controls the "`Throat`" parameter. The remaining parameters are currently "`off`" and therefore have no effect on the sound.

NOTES ■ *The ∞ ("`Cnt5`") and F6 ("CS") function buttons access controller views that deal with different types of controllers. These will be summarized in the "Other Controller Views section on page 47 of this manual.*



Some Exercises With the AltoSax Controllers

Now that you know which physical controllers are assigned to which controller parameters in the AltoSax voice, play the voice using the assigned controllers to get a feel for their effect before changing the assignments.

1. Engage the EDIT Mode

The controller assignments are accessed via the EDIT mode Controller page. To get to this page first press the [ENTER] button to engage the edit mode. This is the initial EDIT mode display:

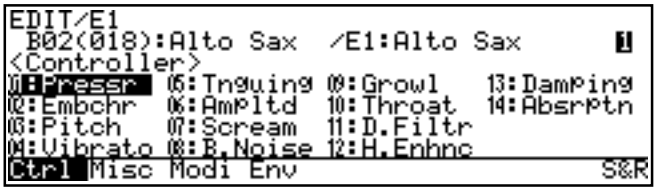


If the initial EDIT mode display shown above does not appear when the [EDIT] button is pressed, try pressing the [EXIT] button one or more times.

> **NOTES** ■ *When the edit mode is selected, the VL1 will automatically go straight to the last edit page that was selected for maximum programming speed and efficiency. You may have to [EXIT] through one or two layers of the EDIT mode display hierarchy to return to the initial display.*

2. Select the Element 1 Controller Parameters

Press the [F2] function button (immediately below "`E1`" on the display) to select the element-1 parameters ("`E2`" also becomes available for access via [F3] when editing a voice that uses two elements).

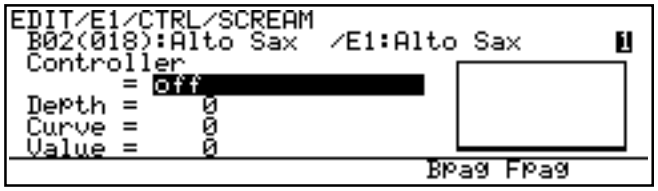


If the display doesn't look like this press the [F1] function button (below "`Ctrl`" on the display) to call the "`Controllers`" page.

3. Select the Controller Parameter You Want To Edit

Use the cursor buttons to select the controller parameter you want to assign a controller to (you can also use the [DEC] and [INC] buttons or data dial for this), then press the [ENTER] button.

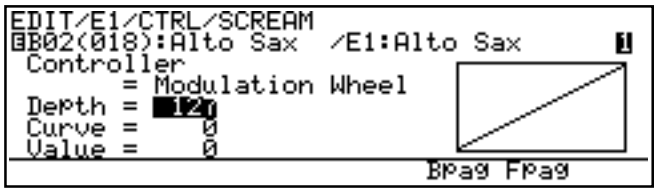
For example, let's try adding scream control to the MODULATION 1 wheel (it currently controls vibrato). Move the cursor to "`07:Scream`" and press [ENTER].



4. Edit the Scream Controller Parameter

The cursor should be located at the "Controller" parameter, as shown in the example display. In the AltoSax voice the scream control parameter is not used so it is currently turned "off". Press the [INC] button or rotate the data entry dial to the right slightly to select "Modulation Wheel", the first controller on the list.

Notice that as soon as you edit the parameter, an inverse letter "E"(E) appears to the left of the voice number near the upper left corner of the display. This tells you that the voice has been edited and, later, that you'll need to store the voice in memory before selecting a different voice if you want to keep the edited data.



NOTES ■ *The Controller parameter has 124 settings — corresponding to the 124 controller number provided by MIDI protocol. Some of these are pre-assigned: Modulation Wheel is number 001, Breath Controller is number 002, etc. When you select a pre-assigned controller the corresponding controller name is shown on the display; non-assigned controllers are displayed as MIDI control change numbers.*

■ *The "Modulation Wheel" setting refers to the VL1's MODULATION 1 wheel. The MODULATION 2 wheel can be assigned to <u>any</u> MIDI control change number.*

5. Try Out the Edited Voice & Cancel the Vibrato Effect

Try operating the [MODULATION 1] wheel while playing the AltoSax voice. You should hear the scream effect increase as the wheel is rolled upward. Vibrato is still assigned to the [MODULATION 1] wheel, so the vibrato effect will come in simultaneously.

To cancel the vibrato effect and leave only the scream effect, simply go to the Controller "VIBRATO" page and turn the Controller parameter "off". To get to the vibrato page you can either [EXIT] to the controller directory introduced in step 2 and select the vibrato page from there, or step backward through the controller pages by using the [F6] function button ("Bpag" stands for "Back page"). In the same way, the [F7] function button can be used to step forward through the controller pages ("Fpag").

NOTES ■ *When "Para" appears above the [F8] function button, as it does in the vibrato and several other controller pages, the [F8] function button accesses another page of parameters pertaining to the controller.*

6. Go to the Pressure Controller Page

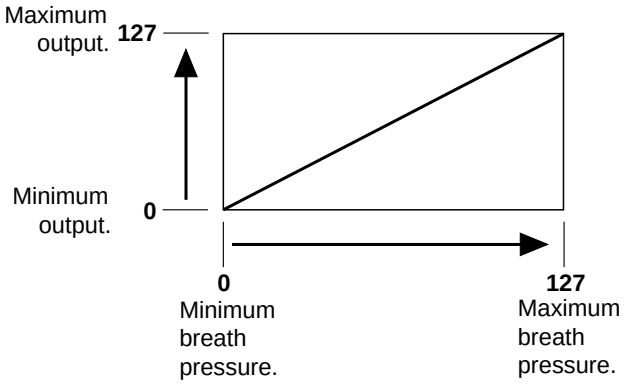
From the Vibrato page use the F6 button to step back to the Pressure controller page. Quite logically, the Breath Controller is assigned to control the "Pressure" parameter, and we will leave it set that way while we experiment with the "Depth" and "Curve" parameters.



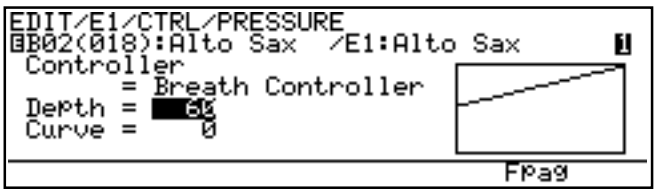
7. Vary the Depth Parameter

Move the cursor to the "Depth" parameter and, while trying out the effect of the changes on how the "Pressure" parameter is affected by the Breath Controller, use the data dial to vary to depth setting.

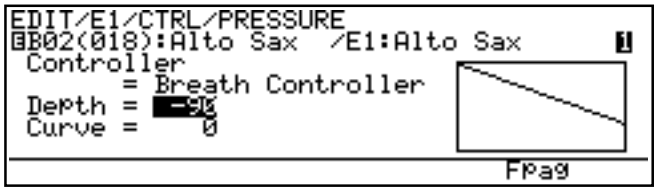
As you decrease the setting, notice that the graph to the right of the display changes accordingly. The horizontal axis corresponds to breath pressure (or the control value in any other controller screen), and the vertical axis represents the depth of the parameter. With "Depth" set to the maximum value of "127" no breath pressure produces no sound and maximum breath pressure produces maximum output.



As the value of the "Depth" parameter approaches zero, however, the depth of the output range is reduced and a corresponding amount of output is produced even at minimum breath pressure. In other words, at a setting lower than 127 simply playing a key will produce sound even without breath pressure, and the Breath Controller will vary output between the initial level and maximum output.



Once you pass zero, you enter a range of "negative" Depth values that produce reverse controller operation: i.e. the output level decreases as you blow harder into the Breath Controller. Like the normal positive range, the negative Depth range is from "0" to "-127".

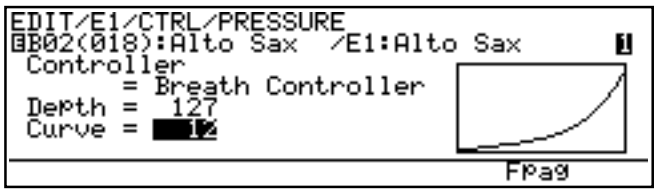


NOTES ■ *Many parameters with any relationship to MIDI control have a range of values from -127 through 0 to 127 (255 steps). This corresponds to the range of values that can be represented in binary form by one "byte" (8 bits) of data — the number MIDI uses to convey control values.*

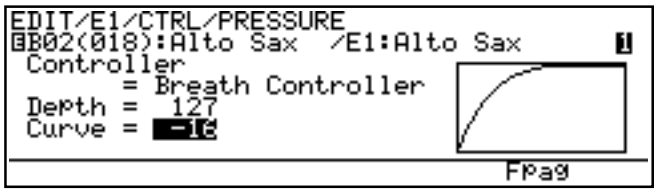
8. Vary the Curve Parameter

You may have noticed in the previous step that the relationship between breath pressure and output is linear. That is, a change in breath pressure produces a corresponding change in sound. The "Curve" parameter makes it possible to change that relationship.

As you increase the curve value (the maximum value is 16), the line on the graph which represents breath pressure versus output will curve downward, as shown in the display below (setting "12"). The result is that the lower end of the breath pressure range has relatively little effect on the sound, while higher breath pressures produce more dramatic changes.



Negative curve values (0 … -16) have the opposite effect: Output increases rapidly at low breath pressures while higher pressures produce relatively little effect.



9. Experiment!

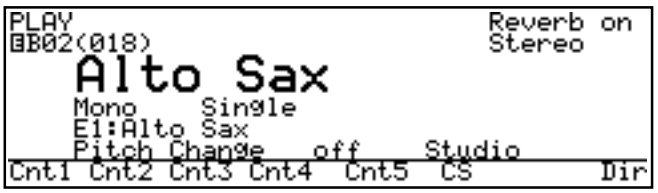
Now that you've got the idea, flip through the all the available controller pages and experiment with alternative assignments and settings until you feel comfortable with the system. You should also try this with different voices later, since the controllers can have different effects with different voices.

NOTES ■ *There are several variations on the basic controller display and parameters. When you're ready to study the parameters in more detail refer to the "Element Controllers" section beginning on page 64 of the Feature Reference manual.*

10. Return to the Play Mode When Done

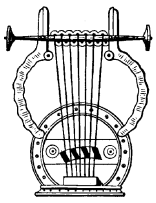
When you're finished experimenting with the controllers, press the PLAY button to return to the play mode.

Note that the inverse letter "E"(E) still appears to the left of the voice number, indicating that the voice has been edited.



If you want to keep the edited voice, it must be saved either to an internal memory location or to floppy disk, as described on pages 28 and 166 of the Feature Reference manual, respectively. This must be done before you select a different voice (or the same voice again) or your edits will be lost. To confirm this, try selecting a different voice and then return to the AltoSax voice … the inverse "E"(E) will be gone and the voice will be as it was before you edited it.

NOTES ■ *The VL1 has a Memory Voice Recall function that can be used to recall the last version of a voice if you accidentally make unwanted changes or lose your edited data as described above — Feature Reference manual, page 172.*

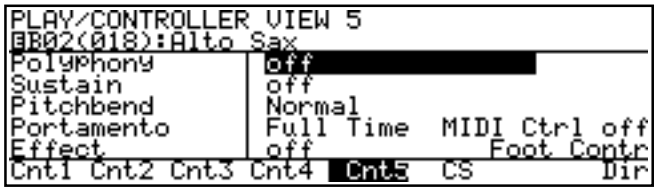


Controller Envelopes

Since acoustic instruments virtually never respond instantaneously to "controller" changes, the VL1 includes a range of controller envelopes that can be used to simulate this type of response. For example, sudden application of maximum breath pressure to a wind instrument or bow speed to a string instrument normally doesn't produce instantaneous sound. The instrument requires a few milliseconds to reach the full resonance demanded by the breath pressure or bowing. The VL1 provides programmable envelopes for the "Pressure", "Embouchure/Pitch", "Vibrato", "Growl", and "Amplitude/Filter" parameters, and these are described in detail on pages 128 through 150 of the Feature Reference manual.

Other Controller Views

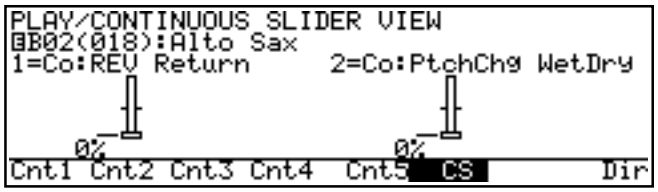
If you press the ∞ function button from the play mode you'll see the following controller view:



The controller parameters listed in this screen are not in the same category as those discussed in the preceding section, and therefore need to be introduced separately. All of the related parameters will be discussed in detail in the Feature Reference manual (pages listed below).

Polyphony	This line shows which controller is currently assigned to polyphony mono/poly control. *(≥ Feature Reference manual, page 36)*
Sustain	Indicates whether sustain control is on or off. *(≥ Feature Reference manual, page 35)*
Pitch Bend	The VL1 has three different pitch bend modes — Normal, Bottom, and Top. The Bottom and Top modes are only effective when the Poly or Unison polyphony mode is selected. When Bottom is selected the lowest of two notes played will be affected by the pitch wheel, and when Top is selected the high note will be affected. When the Normal mode is selected both notes are affected. *(≥ Feature Reference manual, page 35)*
Portamento	The VL1 offers a choice of portamento modes with or without MIDI control capability. This line indicates the current portamento status. *(≥ Feature Reference manual, page 40)*
Effect	Any physical controller can be assigned to control certain of the VL1's effects in certain ways: the wet/dry balance of the pitch change effect, the feedback delay send level, or the reverb send level. This line indicates which effect parameter is assigned for control by which controller. *(≥ Feature Reference manual, page 45)*

The F6 function button calls the Continuous Slider ("CS") controller view, which will look something like this:



The continuous sliders can not be assigned to the instrument controller parameters listed above, but can be independently assigned to several other parameters that you can control in real time while playing. The parameters available for editing via the continuous sliders are individually preset for each voice. You can select from the available range by using the "Continuous Slider" assignment function described on page 43 of the Feature Reference manual.

The continuous slider view shows you which parameters are assigned to which controller as well as the current positions of the controllers and their corresponding values.

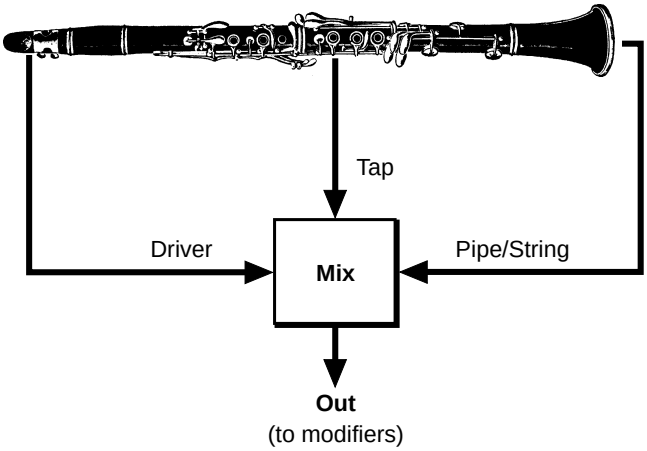
Mixing & The Modifiers

Creating New Timbres and Original Voices

The VL1 provides two ways to change the timbre of a voice to create original variations: 1) by mixing the output signals from various parts of the physical model, and 2) by using the VL1's "Modifiers" to shape the overall harmonic structure. You should always start with the mixing parameters when attempting to create a new voice, so we'll describe mixing first.

Mixing

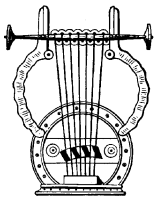
The VL1's physical instrument model produces three output signals that can be mixed to produce a surprising range of timbral variation.



● **Driver**
The "Driver" signal is the direct output from the mouthpiece (or bow/string interface) without the resonance of the instrument's body. In acoustic instruments there is always a certain amount of driver sound — particularly when the instrument is heard at close range. Judicious adjustment of the amount of driver signal added to the sound can significantly enhance the simulation.

● **Pipe/String**
This is the main output from the instrument's pipe or string.

● **Tap**
By "tapping" the output from a specific point along the instrument's pipe or string and mixing that signal with the Driver and Pipe/String signals, a range of variations can be produced. The Tap signal alone sounds almost the same as the Pipe/String signal, but since it has a different phase the tone can change drastically when the two signals are mixed due to phase cancellation and reinforcement.

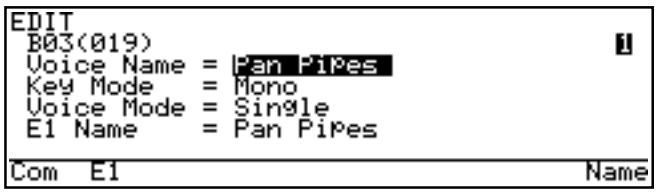


An Exercise: Remix the Pan Pipes Voice

Before going to the EDIT mode, select and play the Pan Pipes voice for a few minutes to get a feel for how it sounds.

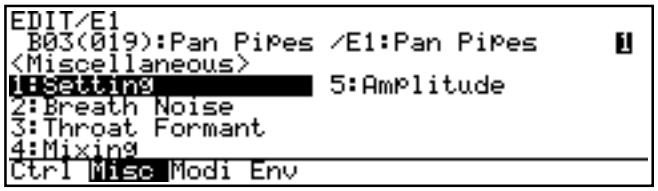
1. Engage the EDIT Mode

The mixing parameters are accessed via the EDIT mode "Mixing" page. To get to this page first press the [EDIT] button to engage the edit mode. You may have to press the [EXIT] button one or more times to get the initial edit display.



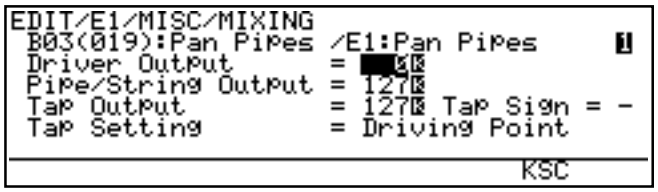
2. Select the Element 1 Miscellaneous Parameters

Press the [F2] function button to select the element-1 parameters, then press the [F2] function button again (below "Misc" on the display) to call the "Miscellaneous" page.



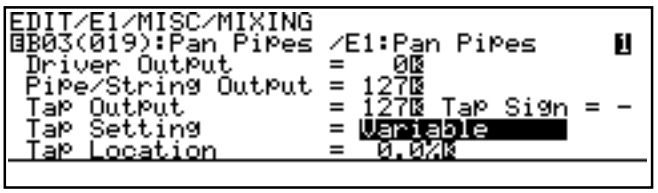
3. Select & Edit the Mixing Parameters

Move the cursor to "4:Mixing" and press [ENTER].

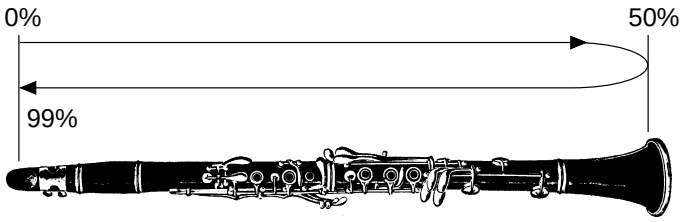


Here you have all the parameters you need to mix the physical model output signals: Driver Output, Pipe/String Output, and Tap Output. These three parameters can be set from "0" (no output) to "127" (maximum output). Try changing their values to see how the sound is affected.

Note that in the example display there are more Tap parameters. There is actually one more: move the cursor to the "Tap Setting" parameter and press the [DEC] button (or use the data dial) to set it to "Variable" (the previous setting, "Driving Point", fixes the position of the tap output at the instrument's driving point). Now the location of the tap can be set at any point via the "Tap Location" parameter. Try changing the "Tap Location" setting and notice how the tone changes.



Tap Location



The remaining tap parameter — "`Tap Sign`" — inverts the phase of the tap signal. It has two settings: "+" and "-". Try it.

4. Return To the PLAY Mode When Done

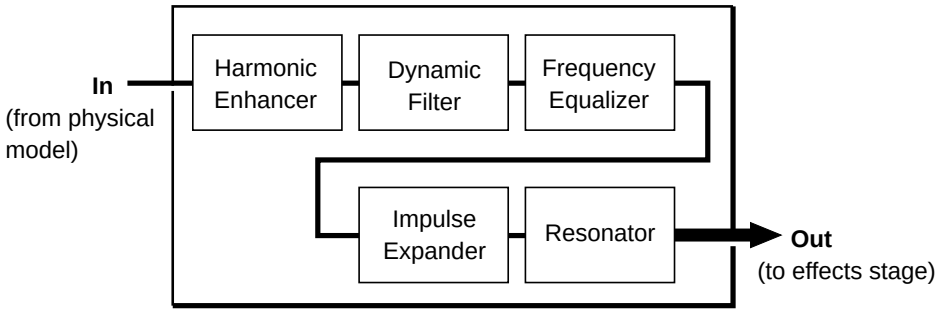
Press the PLAY button to return to the PLAY mode when you've finished experimenting with the mixing parameters.

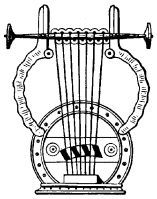
After experimenting with the Mixing parameters for a while you'll discover that they define the basic sound of the instrument. Once you've created the basic sound you want by using the Mixing parameters, then you can move on the Modifiers to refine the sound.

The Modifiers

As described in the "VL1 Basics" section (page 8), the VL1 has five "Modifier" stages that shape the overal timbre of the sound. Although the modifiers can vary the sound over a considerable range, the fundamental timbre of each voice is determined by its physical instrument model. If you start with a trumpet voice, for example, the modifiers will let you create an broad range of timbres, but the final sound will always be more or less trumpet-like. It is therefore important to choose a voice that provides the right foundation for the sound you are trying to achieve when attempting to create an original sound.

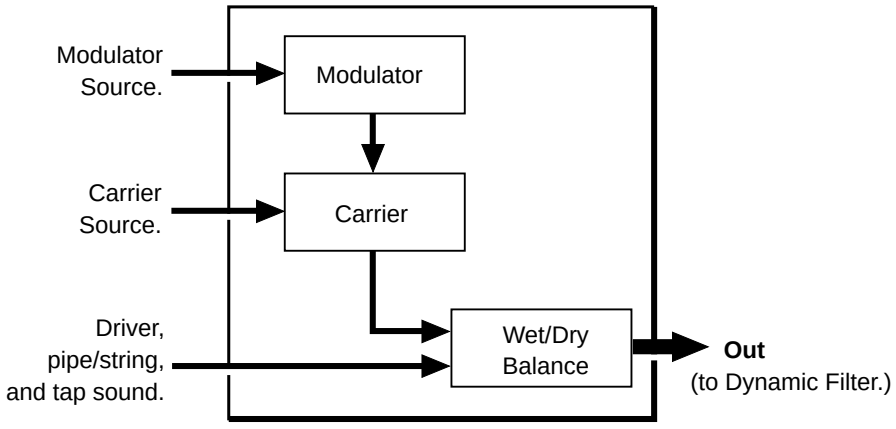
The five modifier stages are:





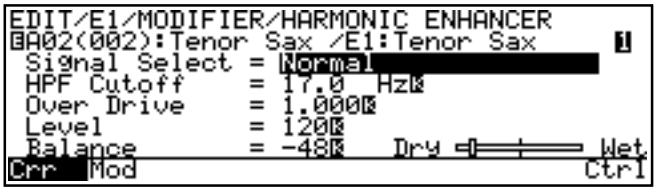
Harmonic Enhancer

Of the five modifier stages, the Harmonic Enhancer has the most pronounced effect on the actual harmonic structure of the sound. It allows you to create radical timbral variations within the current instrument "family".

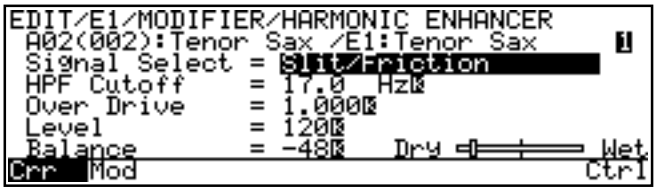


Referring to the block diagram of the harmonic enhancer, above, we can see that it employs a modulation approach to building new harmonic structures. The carrier and modulator blocks have independent display pages and some independent parameters.

■ The Modulator Parameter Page



■ The Carrier Parameter Page



NOTES ■ *If you want to experiment with the Harmonic Enhancer parameters while reading this section, they can be accessed by selecting the EDIT mode and, from the initial EDIT mode display (try pressing [EXIT] if the initial EDIT display doesn't appear), pressing [F2] ("E1") to select the Element 1 parameters, then pressing [F3] ("Modi") to select the Modifier parameters, and finally moving the cursor to "1:Harmonic Enhancer" and pressing [ENTER]. Once the Harmonic Enhancer display is selected the carrier and modulator pages are selected via [F1] ("Crr") and [F2] ("Mod"), respectively.*

The "Signal Select" parameters in these pages allow independent selection of the six different signal sources listed below.

Normal	This is the total output of the instrument model: a mix of the driver, pipe/string, and tap signals.
Breath Noise Amplitude	This signal represents the instantaneous amplitude of the breath noise produced at the driver. It is basically a highly distortion version of the Slit/Friction signal described below.
Flow Rate Saturation	When the pressures on either side of an aperture (e.g. a mouthpiece/ reed assembly) differ, a corresponding flow of air is produced. There is, however, a limit to the speed of the airflow which can be produced (saturation). The relationship between the pressure difference and resulting airflow is derived as the Flow Rate Saturation signal.
Beat	The beat signal represents contact between the vibrating reed and the mouthpiece.
Slit/Friction	As the reed vibrates, the area of gap (slit) between it and the mouth-piece varies accordingly. The Slit/Friction signal corresponds to the varying area of the reed/mouthpiece slit.
Reed	This signal is derived directly from the flexing of the reed.

Although any modulator source signal can be applied to any carrier source signal, two approaches are recommended when attempting to create an acoustic instrument simulation.

The first is to set the carrier signal to "Normal" and the modulator signal to any other than normal, set the dry/wet "Balance" to 63 (all wet), and set a relatively high modulator "Index" value. In this case the total output of the instrument model ("Normal" signal) will by modulated by one of the component signals, so the dry/wet "Balance" can be set to fully wet (modulated carrier output only) since the carrier source and dry signals are essentially the same. The "Index" parameter determines how much modulation is applied, so a higher value is generally required to create sufficient variation.

The second approach is to set the carrier signal to any other than normal and the modulator signal to any of the six possibilities, set the dry/wet "Balance" to a more central value, and set a relatively low modulator "Index" value. In this situation it is necessary to set the "Balance" more toward the "Dry" side since the carrier source signal is not the normal signal and at least some of the dry signal is necessary to provide the basic sound of the instrument model. In other words, the sound produced by the Harmonic Enhancer is simply added to the basic sound of the instrument, in contrast with the first approach in which the basic sound of the instrument is modulated directly.

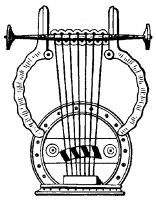
Please note that these are only guidelines, and are by no means the only way to work with the Harmonic Enhancer. Since the Harmonic Enhancer tends to respond differently with different instrument models, experimentation and experience are your most valuable tools.

While the "Balance" and "Index" parameters apply to the overall harmonic enhancer sound, the following independent parameters are provided for the modulator and carrier blocks.

HPF Cutoff	Both the modulator and carrier blocks have high-pass filters that can be used to roll off the low frequencies of the corresponding signal. The cutoff frequency can be varied from 17.0 Hz to 11.2 kHz.
Overdrive	This parameter boosts the corresponding modulator or carrier signal, forcing it into distortion and thereby drastically changing its harmonic structure.
Phase	This parameter is provided for the modulator block only. It allows a degree of timbral variation by varying the phase of the modulator signal through 360 degrees in 2- or 3-degree increments.

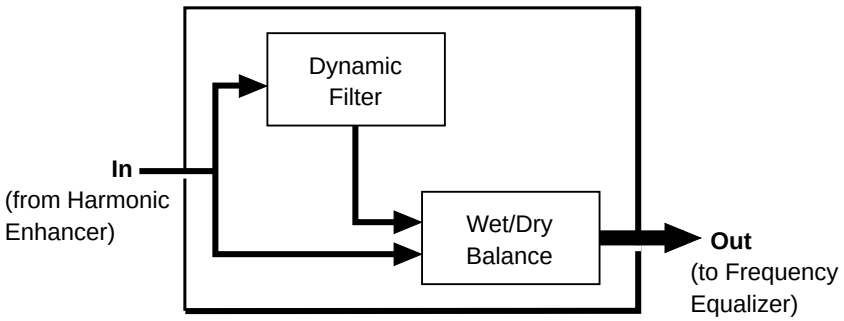
Look at the Harmonic Enhancer display pages again. Parameters with an inverse "K"(K) next to them can also be controlled by key scaling — i.e. the value of the parameter changes according to the pitch of the key played. This makes it possible to achieve both natural and unprecedented timbral variations across the range of the keyboard.

NOTES ■ *Refer to page 107 of the Feature Reference manual for full details on the Harmonic Enhancer parameters.*

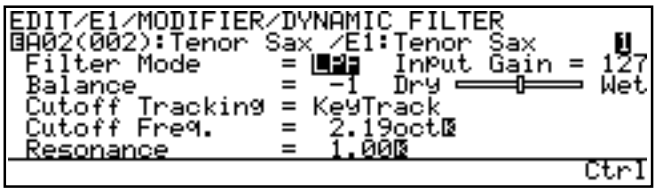


Dynamic Filter

The Dynamic Filter stage is similar to the dynamic filters found in many conventional synthesizers. It allows both fixed and dynamic filtering in high-pass, low-pass, bandpass, and band elimination modes, and is effective for broad tonal control.

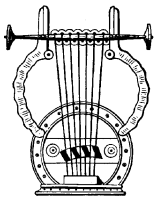


■ The Dynamic Filter Parameter Page



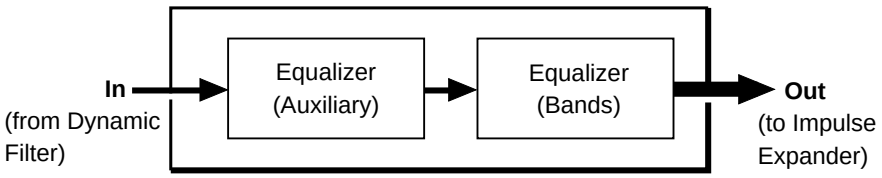
The dry/wet "`Balance`" parameter allows delicate variations in the degree of filtration applied. The "`Cutoff Tracking`" parameter selects either the "`Fixed`" mode in which the cutoff frequency of the filter is fixed at the specified cutoff frequency in Hz ("`Cutoff Freq.`" parameter), or the "`KeyTrack`" mode in which the cutoff frequency varies according to the key played. When "`KeyTrack`" is selected the cutoff frequency is specified in octaves. Another important feature is "`Resonance`" — a parameter that produces a variable resonant peak at the specified cutoff frequency in any of the filter's modes.

NOTES ■ *Refer to page 115 of the Feature Reference manual for full details on the Dynamic Filter parameters.*

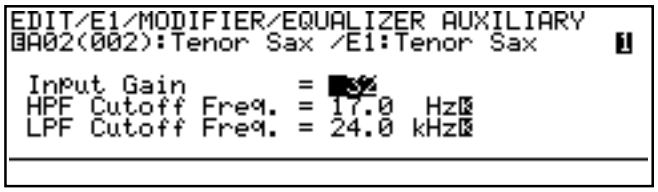


Frequency Equalizer

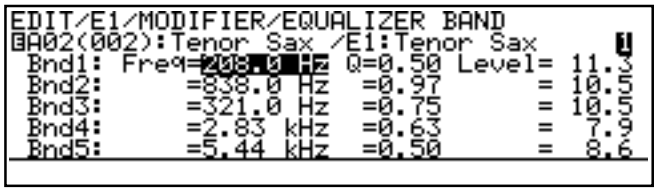
The Frequency Equalizer stage consists of two blocks — Auxiliary and Band — each with its own display page.



■ The Equalizer Auxiliary Parameter Page



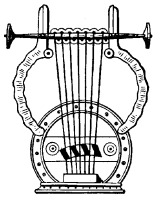
■ The Equalizer Band Parameter Page



The Auxiliary block includes programmable low-pass and high-pass filters that can be used independently or together to create a bandpass response. Both the low-pass and high-pass filters have independent key-scaling parameters that can be used to vary the gain of the filters across the range of the keyboard. The "`Input Gain`" parameter adjusts the level of the signal applied to the input of the Equalizer Auxiliary stage.

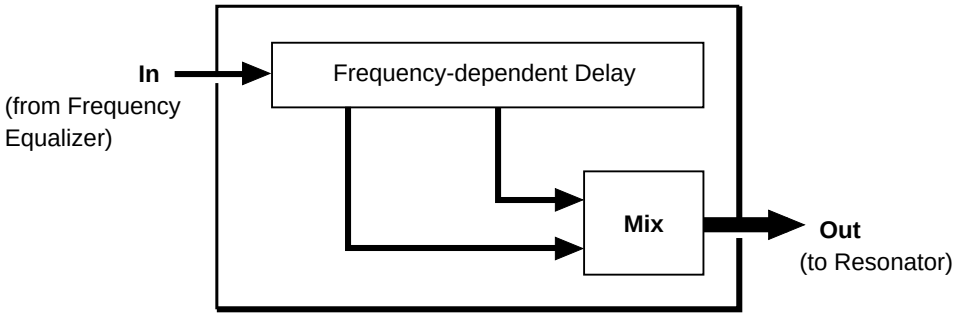
The Equalizer Band block is a 5-band parametric equalizer with frequency, Q (bandwidth), and level control. The Band block functions in the same way as any standard parametric equalizer, allowing flexible response control over a wide range.

NOTES ■ *Refer to page 122 of the Feature Reference manual for full details on the Frequency Equalizer parameters.*

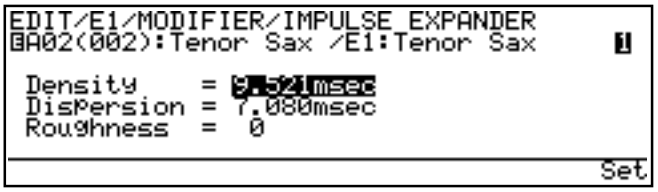


Impulse Expander

The Impulse Expander works in conjunction with the Resonator, described below, to simulate the effect of an instrument's resonant cavity or sound box. It can also be used to simulate the acoustic environment in which the instrument is played.



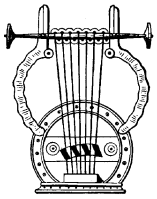
■ The Impulse Expander Parameter Page



In contrast to the Resonator, the Impulse Expander is more suited to the simulation of metallic resonances and is thus invaluable for refining the sound of brass and metal-bodied woodwinds. Other important effects are the ability to diffuse sharp attack sounds and to give depth and realism to vibrato. In fact, the Impulse Expander should only be used with voices which have a degree of vibrato or other cyclic variation, since its effect is less noticeable on uniformly sustained sounds.

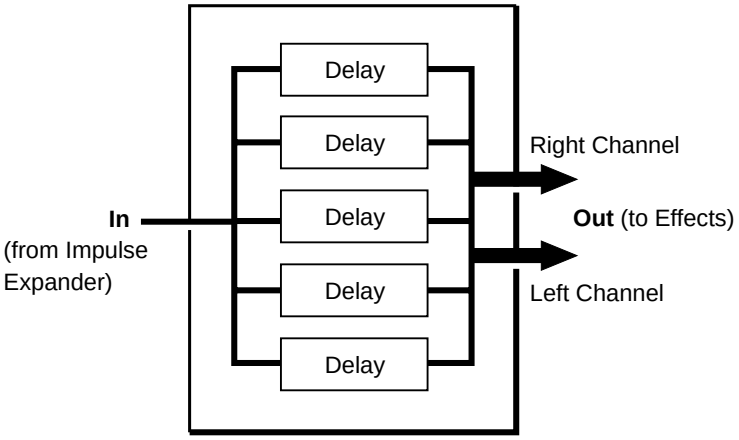
Since the Impulse Expander is not essential for all voices, it can be turned completely off when not needed. It also has "`Wet Level`", "`Dry Level`", and stereo "`Level Balance`" parameters that allow its effect to be blended into the main sound as required.

NOTES ■ *Refer to page 125 of the Feature Reference manual for full details on the Impulse Expander parameters.*

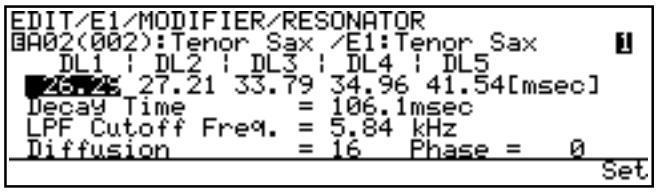


Resonator

While the Impulse Expander tends to give the sound a metallic quality, the Resonator produces a more woody resonance effect. Careful adjustment of the resonator's parameters can often bring a not-quite-right voice to life.



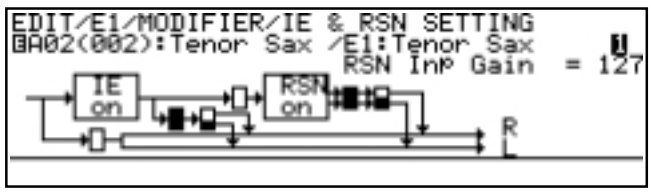
■ The Resonator Parameter Page



The Resonator basically consists of five parallel delay lines with independently programmable delay times (`DL1` through `DL5`, variable from 0.25 to 41.45 milliseconds). Other parameters include variable "`Decay Time`", "`LPF Cutoff Freq.`" (low-pass filtercutoff frequency), "`Diffusion`", and "`Phase`".

Like the Impulse Expander, the Resonator is not essential for all voices and can be turned completely off when not needed. It also has "`Input Gain`", "`Wet Level`", and stereo "`Level Balance`" parameters that allow its effect to be blended into the main sound as required (the cursor is moved around the block diagram in the "IE & RSN SETTING" page, shown below, to select the parameters associated with the various blocks).

■ The Impulse Expander & Resonator Setting Page (IE = Impulse Expander, RSN = Resonator)

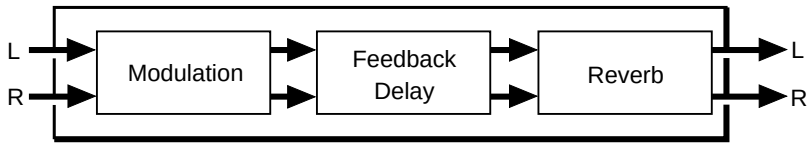


NOTES ■ *Refer to page 126 of the Feature Reference manual for full details on the Resonator parameters.*

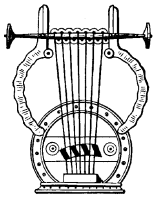
Effects

Creating the Right Ambience

Effects are the essential finishing touches for any voice. Once you've created a sound you like, use one or more of the VL1's three high-performance digital effect stages to polish and refine it as required. Each stage includes a number of effects. The Modulation, Feedback Delay, and Reverb stages can be used simultaneously, but only one of the effects available in each stage can be used at a time.



All effects can be accessed from the initial EDIT mode display by press the F1 button ("Com") to select the common voice parameters, and then the F2 button ("Efct") to call the effect directory. Then move the cursor to the name of the desire effect stage and press ENTER button.

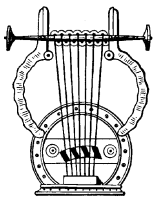


Modulation Effects

Although “modulation” usually implies some sort of cyclical variation, the VL1 Modulation stage allows selection of Flanger, Pitch Change, and Distortion effects (only Flanger fits the traditional definition of a modulation effect). Since most of these effects produce a marked change in the sound, you’ll probably only want to use them on certain voices, and maybe not all the time.

Flanger	This type of effect is created by slightly delaying the sound and periodically varying the delay time. The delayed signal is then added to the direct signal causing a variable comb-filter effect which results in the familiar “swishing” flanger sound.
Pitch Change	A dual pitch change effect which can be used in the Mono mode, in which both pitch-shifted notes appear on both channels, or the Stereo mode in which one pitch-shifted note appears on the left channel and the other on the right. The pitch of the two pitch-shifted notes can be set over a two-octave range — from one octave below to one octave above the input note.
Distortion	An extremely versatile distortion effect which offers transistor, vintage tube, fuzz and other distortion types, a variety of speaker types, and a comprehensive range of other parameters that can be used to refine the distortion sound.

NOTES ■ *Refer to page 46 of the Feature Reference manual for full details on the Modulation effects and parameters.*



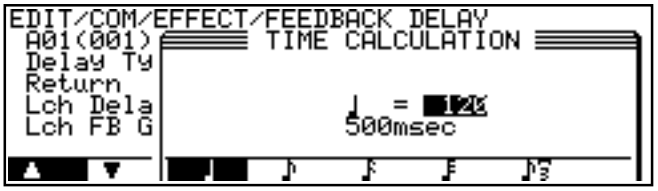
Feedback Delay Effects

All three effects available in the Feedback Delay stage are basically designed to produce distinct repeat delays or echoes. You have extensive control over the number of repeats produced and the way they decay.

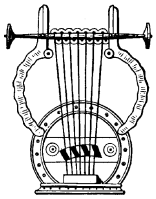
Mono	The Mono delay effect produces a single delay sound which appears in the center of the stereo sound field.
L, R	This variation provides independently programmable delays for the left and right stereo channels.
L, C, R	Independent delays are provided for the left and right channels, plus a center delay.

Since the goal in producing a delay effect is often to match the delay time to a musical time value, the VL1 includes a “time calculation” function that makes it easy to convert standard note values to their corresponding delay times in milliseconds.

■ The Time Calculation Pop-up Page



NOTES ■ *Refer to page 53 of the Feature Reference manual for full details on the Feedback Delay effects and parameters.*



Reverb Effects

You'll probably want to apply the effects in this stage to some degree to all your voices. These are the effects that will give your sound ambience and a sense of dimension, adding warmth and depth to an otherwise dry sound.

Hall 1	A simulation of the reverbation characteristics of a fairly standard concert hall.
Hall 2	This hall simulation produces a richer low-frequency reverb sound than the Hall 1 program.
Room 1	The ambience of a small room rather than a large hall. This effect is ideal when you just want a subtle touch of ambience.
Room 2	A larger room than the Room 1 simulation, with a correspondingly "bigger" reverb sound.
Studio	In recording studios it is generally desirable to suppress low-frequency reverberation without entirely losing the "live" sound of the room. The Studio program simulates this type of environment.
Plate	The plate reverb unit is a classic tool of the recording trade — it was the first mechanical method of creating artificial reverberation that was capable of producing satisfactory results in the studio. This is a very realistic simulation.
Space	A diffuse reverberation of the type you might experience in an extremely large space.
Reverse	In this effect the reverb sound plays in reverse, building up to maximum level rather than decaying as normal.

For even more versatility all of the reverb effects have a "Feel" parameter with four settings which produce significant changes in the basic sound of the effect. In essence you have 32 distinct reverb programs (8 effects x 4 Feel settings). Another innovative feature of the reverb effects is a Reverb Time Boost parameter which can be used to extend the tail end of the reverb sound in fine increments.

NOTES ■ *Refer to page 60 of the Feature Reference manual for full details on the Reverb effects and parameters.*

Index

This index covers both the VL1 *Getting Started* and *Feature Reference* manuals for easy cross-referencing. Page numbers in the *Getting Started* manual are preceded by "GS", and page numbers in the *Feature Reference* manual are preceded by "FR".

A

Absorption FR 81
Aftertouch curve FR 157
Amplitude & filter envelope FR 143
Amplitude & filter key scaling FR 146-150
Amplitude FR 71
Assign mode FR 35

B

Backup battery GS 4
Bank buttons GS 19, 34. FR 15
Breath attack gain FR 36
Breath attack time FR 36
Breath control curve FR 157
Breath controller calibration GS 29
Breath controller GS 23
Breath controller jack GS 19
Breath noise FR 73, 86
Breath noise key scaling FR 88-90
Bulk dump, MIDI FR 161

C

Common miscellaneous FR 34
Confirm mode FR 158
Continuous slider assignment FR 43
Continuous sliders GS 18, 47. FR 19
Controller envelopes GS 46
Controller search & replace FR 82
Controller parameters GS 40
Controller views GS 41, 47. FR 17
Controllers GS 12, 38
Conventions GS 7
Copy button GS 17
Copy function FR 25
Crossfade speed FR 85
Cursor buttons GS 18

D

Damping FR 80
Data dial GS 18, 35. FR 16
Decrement & increment buttons GS 18, 35. FR 16
Demo playback GS 26. FR 175
Device number FR 155
Disk format FR 171
Disk status FR 163
Disk, delete file FR 170
Disk, load from FR 164
Disk, rename file FR 168
Disk, save to FR 166
Display mode FR 158
Distortion FR 51
Dynamic filter GS 54. FR 77, 115
Dynamic filter key scaling FR 117-118

E

Edit compare function FR 24
Edit recall FR 173
Effect control FR 45
Effect on/off FR 23
Effects GS 58
Element detune FR 37
Element level FR 38
Element names FR 31
Element note shift FR 37

Element on/off FR 22
Element pan FR 38
Element random pitch FR 37
Element select FR 22
Embouchure & pitch envelope FR 130
Embouchure & pitch envelope key scaling FR 132-134
Embouchure FR 66
Enter button GS 18
Equalizer auxiliary FR 119
Equalizer band FR 122
Equalizer GS 55
Equalizer key scaling FR 120-121
Error messages FR 180
Exit button GS 18

F

Feedback delay effects GS 59
Feedback delay FR 53
Feedback delay/reverb mode FR 45
Flanger FR 47
Floppy disk drive GS 19
Floppy disks & drive, handling GS 5
Foot controller 2 assign FR 156
Foot controller jacks GS 20
Foot controllers GS 23
Foot switches GS 23
Foot switch assign FR 156
Foot switch jacks GS 20
Function buttons GS 18
Functions & parameters, finding FR 9

G

Greeting message FR 158
Growl envelope FR 141
Growl FR 74
Growl speed key scaling FR 142

H

Harmonic enhancer GS 51. FR 78, 107
Harmonic enhancer key scaling FR 110-115
Headphones GS 23

I

Impulse expander & resonator setting FR 123
Impulse expander GS 56. FR 125
Initial edit page FR 30
Interpolate speed FR 85

K

Key mode FR 31
Keyboard GS 19
Keyboard transpose FR 153

L

L,C,R delay FR 57
L,R delay FR 55
LCD display GS 18
Local on/off FR 155

M

Manuals, about the GS 6. FR 4
Master tuning FR 154
Memory protect FR 158
Micro tuning FR 42
MIDI connections GS 24
MIDI connectors GS 20
MIDI settings FR 155
Mixing GS 48. FR 98
Mixing key scaling FR 100-105
Mode buttons GS 17
Modes, the 3 main FR 8
Modifier on/off FR 23
Modifiers GS 51
Modulation effect type FR 46
Modulation effects GS 59
Modulation wheel 2 assign FR 156
Modulation wheels GS 19
Mono delay FR 53

N

Navigation aids FR 11

O

Octave buttons GS 19
Octave switch hold FR 153
Output jacks GS 20

P

Phones jack GS 19
Pitch bend mode FR 35
Pitch change FR 49
Pitch FR 67
Pitch wheel GS 19
Play-mode display GS 34. FR 14
Polyphony control FR 36
Portamento FR 40
Power cord socket GS 20
Power supply GS 22
Power switch GS 20
Power-on procedure GS 25
Pre-programmed voices, loading GS 31
Pressure envelope FR 129
Pressure FR 65

Q

Quick editing FR 19

R

Receive channel FR 155
Resonator GS 57. FR 126
Reverb effects GS 60
Reverb FR 60

S

Scream FR 72
Selecting & editing parameters FR 12
Sound system GS 24
Specifications FR 184
Store button GS 17
Store function FR 28
Sustain FR 35

T

Throat formant FR 75, 91
Throat formant key scaling FR 93-97
Time calculation, musical FR 59
Tonguing FR 70
Touch EG time FR 36
Transmit channel FR 155
Trigger mode FR 85
Troubleshooting FR 178

V

Velocity curve FR 157
Vibrato envelope FR 135
Vibrato envelope key scaling FR 137-140
Vibrato FR 69
Voice directory GS 36
Voice list, abbreviated GS 37
Voice mode FR 32
Voice name FR 31
Voice number buttons GS 19, 34. FR 15, 22
Voice selection GS 34. FR 15
Volume control GS 18

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