POWER PLAY VZ!

THE ESSENTIAL GUIDE TO PRACTICAL APPLICATIONS.

CASIO

VZ - 1
VZ - 10M
VZ - 8M

By
STEVE DE FURIA
and
JOE SCACCIAFERRO

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by STEVE DE FURIA **and**
JOE SCACCIAFERRO

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Foreword

CASIO created an entire new market for electronic keyboards in 1979, with the introduction of the CT-210, followed in 1980, by the first mini-keyboard, the M-10. Many classic models followed those early releases — remember the MT-40? How about the CT-101, with that great Frog sound, and the CT-701, with bar code reader, and the CT-7000, which had a 3-track digital sequencer back in 1983?.

In those days, many thought of CASIO as a manufacturer of "*toy* keyboards", despite the tremendous amount of ingenuity that went into those "toys". Even when the CZ series was introduced in 1984, people said, "Toy *synthesizers* — how cute!" — but 80,000 or so CZ owners worldwide proved that CASIO had arrived in the pro audio market. (The CZ-101, in fact, is still among the most popular synthesizers ever.)

Ten years (and over 10 million CASIO keyboards sold) later, the synthesizer market is a crowded one. Technology has grown by leaps and bounds (occasionally by fits and starts), and sounds that weren't conceived of two or three years ago have been rendered "classics" (or done to death). Sometimes it has even seemed that, despite the growing power of the tools, the availability of ready-made sounds would replace the original creation by artists of innovative and unique sounds. It has, therefore, been encouraging for us at CASIO to watch the amount of end-user support, sharing of information, enthusiasm and creativity that has been generated by and for the entire CZ — and now the VZ — series.

The VZ synthesizers (as well as the PG guitar) are powerful sound creation devices. They offer a unique timbral alternative to many of the hybrid-sounding machines now on the market. They can sound meaty or mellow, old-style or new, digital or analog. They are true synthesizers, offering a formidable toolbox with which to create your own soundscapes. Joe and Steve have laid some concise groundwork here to introduce you to the multitude of sonic options you have before you — we at CASIO encourage you to use this information as a springboard for your own innovation. Don't limit yourself to preset configurations and sounds. Simply reworking the configurations and detuning (especially pitch fix) can radically alter a normal mode sound; working with delay trigger, velocity inversion, and detuning in menu 2 can make your combinations striking and impressive.

On behalf of CASIO, I wish to thank you for going with a VZ or PG, and wish you the best in making music with it. To all those who are striving to genuinely *create*, we at CASIO salute you. Thanks to Joe and Steve for an informative and enlightening look into a marvelous musical instrument.

Ed Alstrom
Marketing Manager
CASIO Professional Musical Products

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Part 1:

Overview of VZ Instruments

Part 1:
Overview of VZ Instruments

Power Play VZ! is a guide to playing and programming Casio's VZ-1, VZ-10M and VZ-8M digital synthesizers. Our goal is to help you learn how to create and modify sounds on your VZ, and also to help you to understand and take advantage of the VZ's powerful MIDI features. Not only do we cover all the details of playing the VZ from a keyboard player's point of view, we present a lot of information of special interest to guitarists and wind players. We give you many specific tips on using the VZ with Casio's PG-380 MIDI guitar and DH-200 MIDI horn, as well as showing you how to "customize" your VZ to be a tone module for any MIDI guitar or wind controller. There are three major sections in this book.

In ***Part 1: Overview of VZ Instruments***, we give you an overview of the features of each instrument, and the ways they can be used together in a MIDI system. Special attention is given to the use of VZ synthesizers with MIDI guitar and wind controllers. At the end of this section (*Getting Around on the VZ*), we present a complete "road-map" to all of the voice, effect, and system parameters of the VZ-1, VZ-10M and VZ-8M.

In ***Part 2: Exploring iPD Synthesis***, we demonstrate all of the main iPD synthesis parameters through a series of hands-on experiments. This series is designed give you a practical understanding of iPD synthesis, with each experiment focused on a specific iPD concept. Since we believe that a sound, like a picture, can be worth a thousand words, our experiments will let you learn by listening to sounds and looking at pictures. You won't have to read thousands of words to gain a thorough understanding of how your VZ works. In a special section, *Finding your way around a VZ sound* we show you how to quickly isolate and identify the function of each of the eight modules in *any* VZ sound.

In ***Part 3: Editing Examples***, we give you many examples, tips and techniques for creating performance effects for your VZ. All of the examples use a step-by-step approach that shows how to add the effect either to existing presets or to sounds you make from scratch. You'll learn how to add "must have" performance effects like velocity dynamics, vibrato, tremolo and after touch, as well as methods to create keyboard splits and positional cross-fades. The final examples demonstrate several ways to create dramatic echo and stereo effects.

Much of the information and many of the progamming techniques presented in ***Power Play VZ!*** are not available anywhere else. To get the most out of the book, keep your VZ owner's manual handy as a reference and, of course, have your VZ powered up and ready to play.

The VZ Family

The VZ-1 keyboard synthesizer, VZ-10M and VZ-8M synthesizer tone modules, along with the PG-380 MIDI guitar and DH-200 MIDI horn, are the newest members of Casio's professional musical instrument line. The VZ synthesizers use Casio's proprietary *iPD* (interactive phase distortion) technology to generate sounds. These powerful synthesizers offer many exciting features to anyone making music with MIDI:

Unique iPD Synthesis Technology

- A single VZ voice can consist of as many as eight independent sounds! Each voice is made up of four pairs of modules called lines. Each of the two modules within a line can be used as an independent additive synthesis or ring modulation sound source, with its own pitch, waveform and envelope; or one module can interact with the other to produce unique iPD timbres.
- All of the key parameters in any single VZ voice can be controlled during real-time performance to produce dramatic realism or stunning effects. Key-follow functions allow you to create split keyboards, positional cross-fades, layered voices, and envelope rate and level scaling. Velocity functions allow you to control splits and cross-fades, as well as expressive dynamics, with your keyboard "touch." Vibrato, tremolo, pitch bend, and other effects can be controlled by after touch, foot controller, mod wheel, or any MIDI controller you choose.
- Voices are compatible on all VZ synthesizers as well as the PG-380 MIDI guitar's built-in synthesizer.

MIDI Flexibility

- The VZs have all of the standard MIDI features: MIDI controllers, Program Change, MIDI Velocity, Pitch Bend, After touch, and independently selectable Send and Receive channels.
- The VZs also have many additional MIDI features that are especially useful if you plan to use your VZ with a sequencer, guitar controller, or wind controller. They support both "mono mode" and "poly mode" MIDI guitars. A unique multi-mode feature allows the VZ to respond to as many as eight separate MIDI "areas." You can set the voice, polyphony, and channel number for each MIDI area.

Dynamic stereo Effects

- You can use Line 1 and Line 2 audio outputs as left and right stereo outputs, or to send different sounds to separate effects and mixer channels.
- The VZ-8M has three built-in pan modes for dynamic stereo effects.
- You can create additional stereo effects like auto, velocity, and keyboard panning on any VZ synthesizer.

Powerful Play Modes

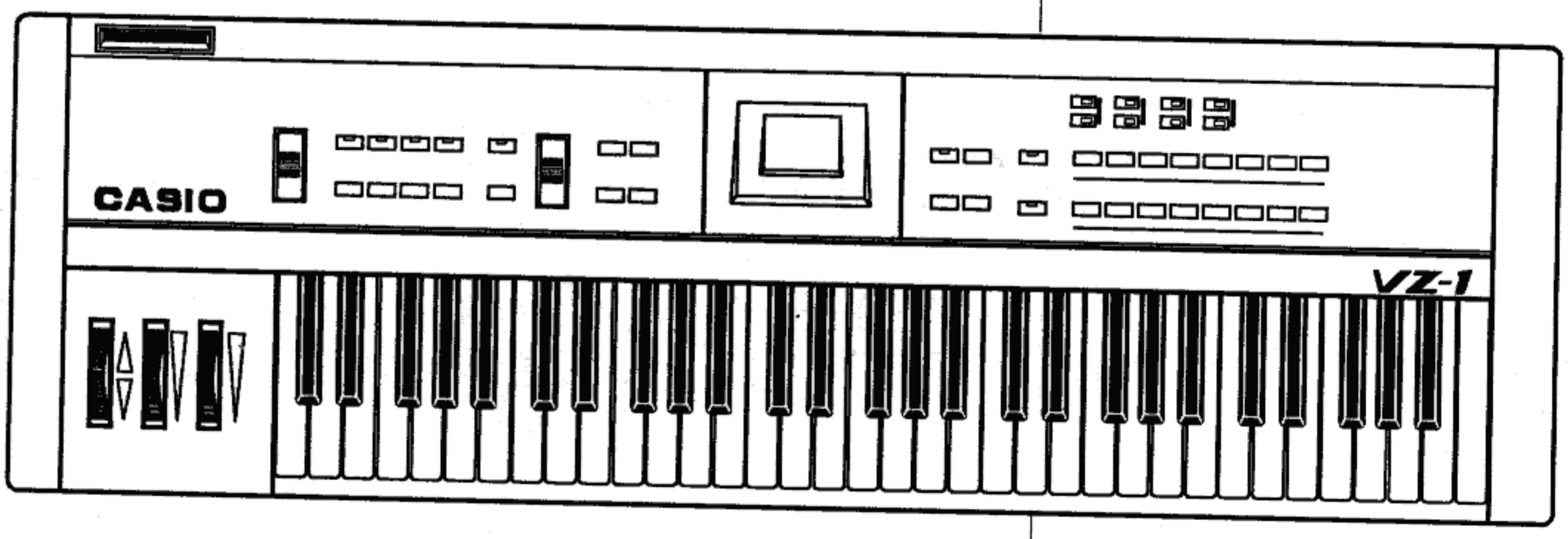
- The Combination mode allows you create split and layered keyboard set-ups, and assign up to four different voices to each set-up.
- Each of the voices in a Combination mode set-up can have an independent response to pitch bend, after touch, vibrato and other real-time effects.
- You can program positional cross-fades as well as velocity splits and layers into Combination mode set-ups.
- A delay trigger function allows you to create digital delay and echo effects in the Combination mode.

Expandable Polyphony

- The VZ-8M's MIDI overflow feature allows you to expand the polyphony of your VZ system in blocks of eight notes. You can expand the polyphony to a total of 64 voices.

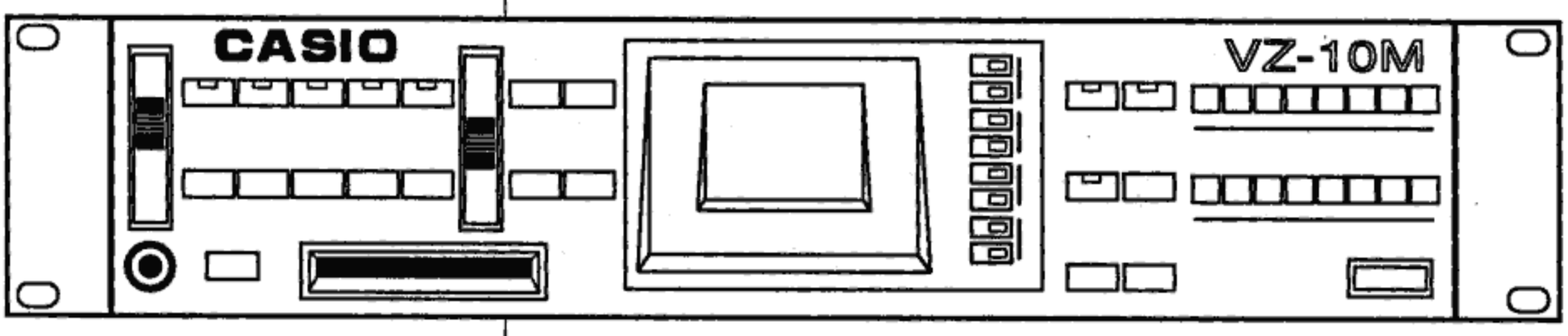
VZ-1 Keyboard Synthesizer

The VZ-1 is a programmable keyboard synthesizer. The VZ-1 can function as a 16-voice MIDI keyboard synthesizer or as a multi-timbral MIDI tone module. The VZ-1 can also be used to create or customize RAM card voices to be played from the PG-380's internal synthesizer. The high-resolution graphics display greatly simplifies voice editing. Extensive MIDI features make the VZ-1 a powerful master controller, flexible enough to be the heart of any MIDI performance or studio system. You can even control the VZ-1 simultaneously from its built-in keyboard *and* from a MIDI guitar or wind controller.



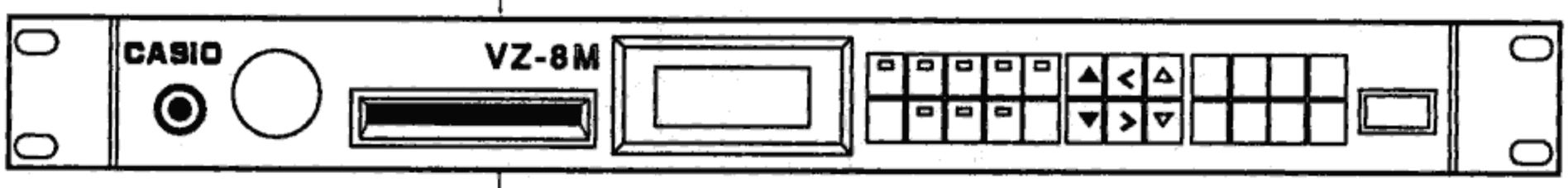
VZ-10M MIDI Tone Module

The VZ-10M is a programmable multi-timbral, 16-voice MIDI tone module. Its synthesis capabilities are indentical to those of the VZ-1. It can be used as a slave to the VZ-1, PG-380, MIDI Horn or any MIDI controller. Like the VZ-1, the VZ-10M can also be used to create or customize RAM card voices to be played from the PG-380's internal synthesizer.



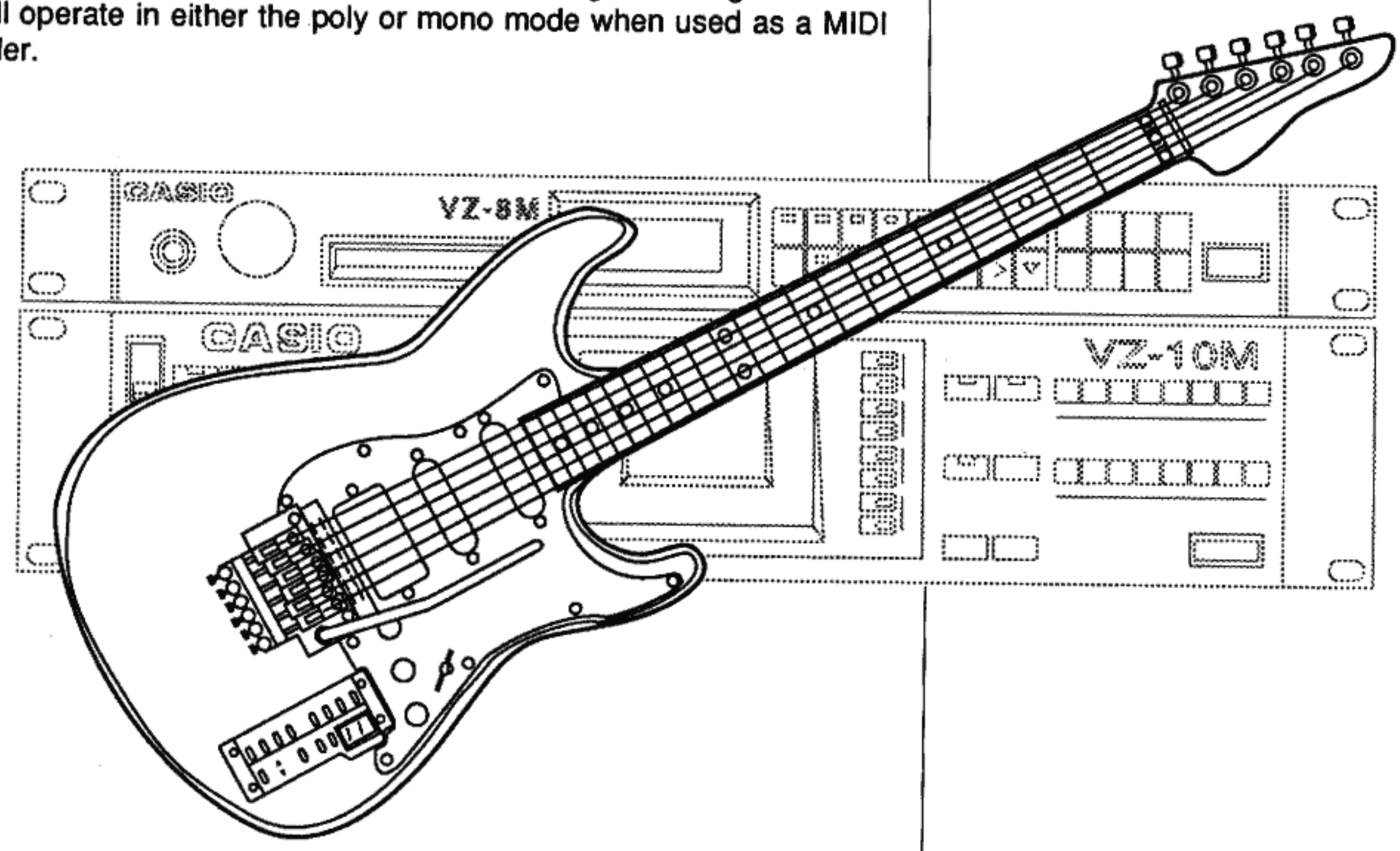
VZ-8M MIDI Tone Module

The VZ-8M is a programmable multi-timbral, 8-voice MIDI tone module. It also can be used as a slave to the VZ-1, PG-380, MIDI Horn or any MIDI controller. The VZ-8M's unique overflow mode allows it to be used as a polyphony expander for other VZ synthesizers. Using the overflow mode, each VZ-8M expands the polyphony of a VZ MIDI system by eight voices. As many as eight VZ-8Ms may be combined to create up to 64 note polyphony. The VZ-8M offers several enhancements to the VZ-1 and VZ-10M, such as performance modes for keyboard, guitar and wind controllers, and stereo panning effects.



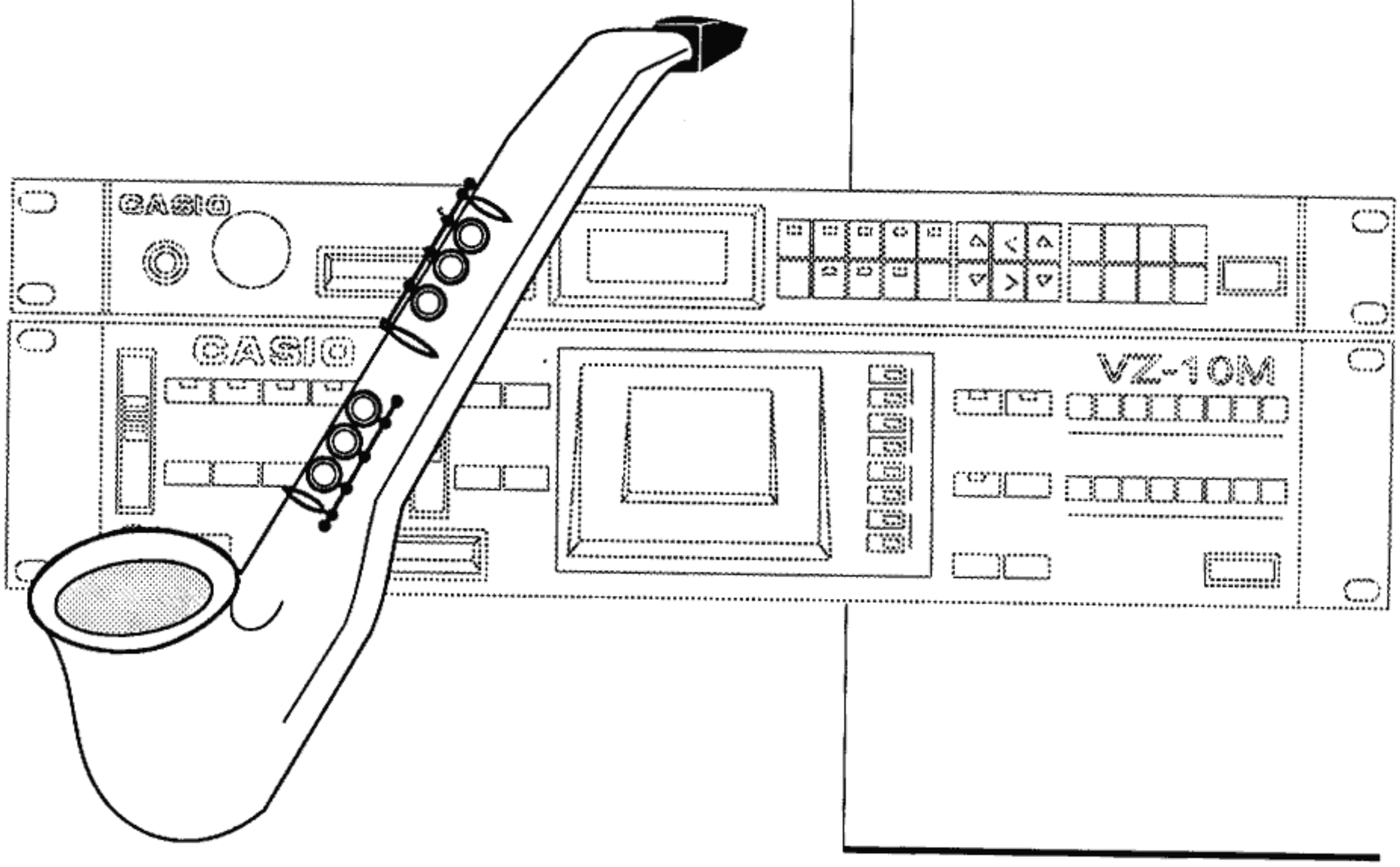
PG-380 MIDI Guitar

The PG-380 is a MIDI Guitar with built-in VZ non-programmable synthesizer that can play any "Normal" voices created on any VZ synthesizer from inserted VZ RAM or ROM cards. The PG-380 can also be used as a MIDI controller, controlling any MIDI synthesizer from its guitar strings. The PG-380 will operate in either the poly or mono mode when used as a MIDI controller.



DH-200 MIDI Horn

The DH-200 is a MIDI wind controller with a built-in sound generator. It can control any synthesizer via MIDI. Notes can be triggered by fingering the keys, or by a combination of breath pressure and fingering.



Differences between VZ-1/VZ-10M and VZ-8M

All three VZ synthesizers are compatible with each other in terms of general operation and voice data. You can use the same RAM and ROM voice cards to transfer voices between any of the VZs. There are, however, some basic differences. The VZ-1 is a stand alone MIDI instrument with a built-in keyboard, while the VZ-10M and the VZ-8M are MIDI tone modules. The VZ-1 and VZ-10M have large LCD graphic displays that allow you to see and program such parameters as envelopes and velocity curves graphically. The VZ-8M has built-in performance modes that optimize it for use with guitar and wind controllers. In the following section, we'll outline the major differences between the VZ-1, VZ-10M and VZ-8M.

Polyphony

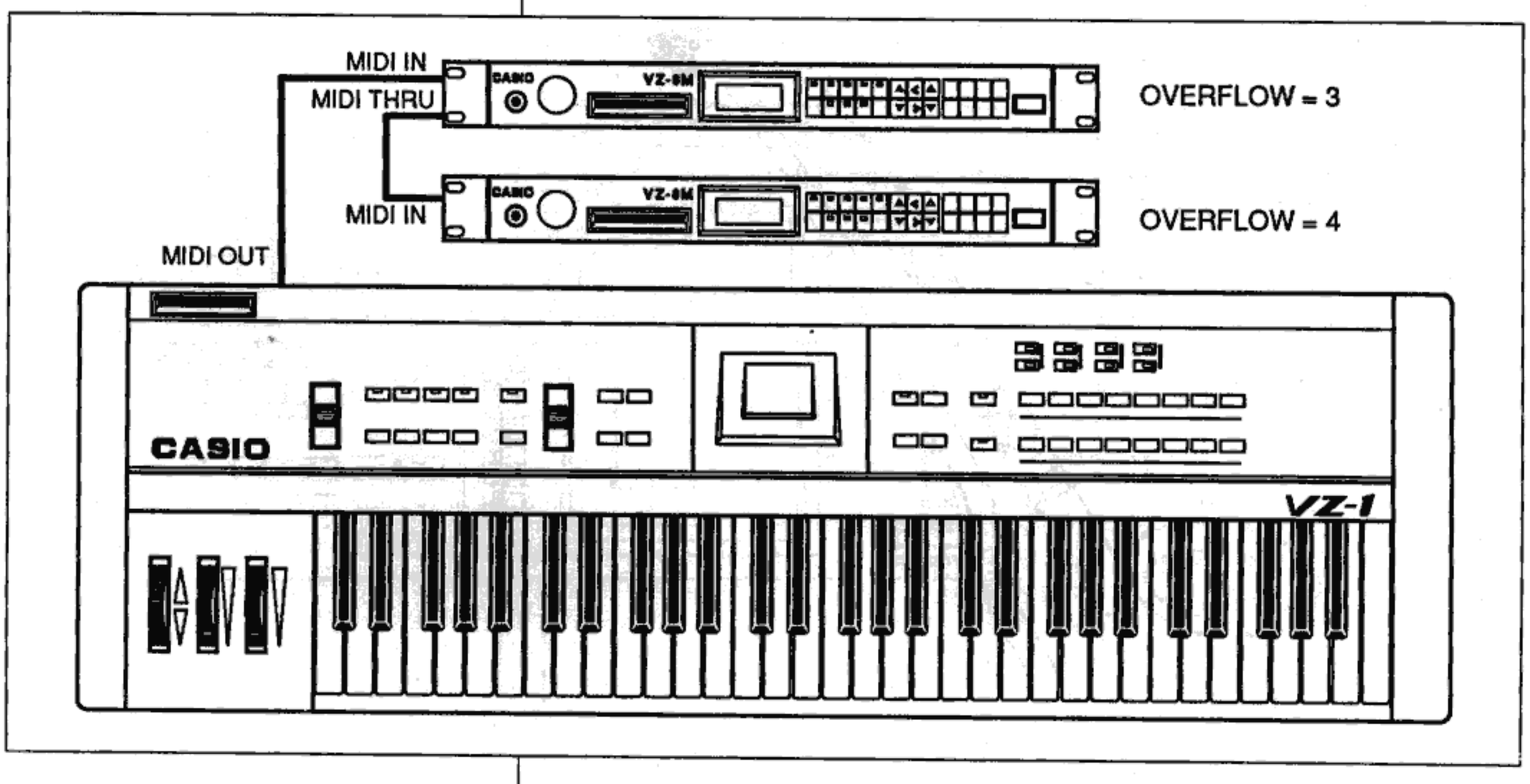
The total number of notes that can sound simultaneously on a VZ synthesizer will vary, depending on the type of voice memory — Normal, Combination, or Multi. The VZ-1 and VZ-10M may sound up to sixteen notes simultaneously, while the VZ-8M can sound up to eight. The following chart shows the maximum number of notes that can be played on each instrument for each type of voice memory.

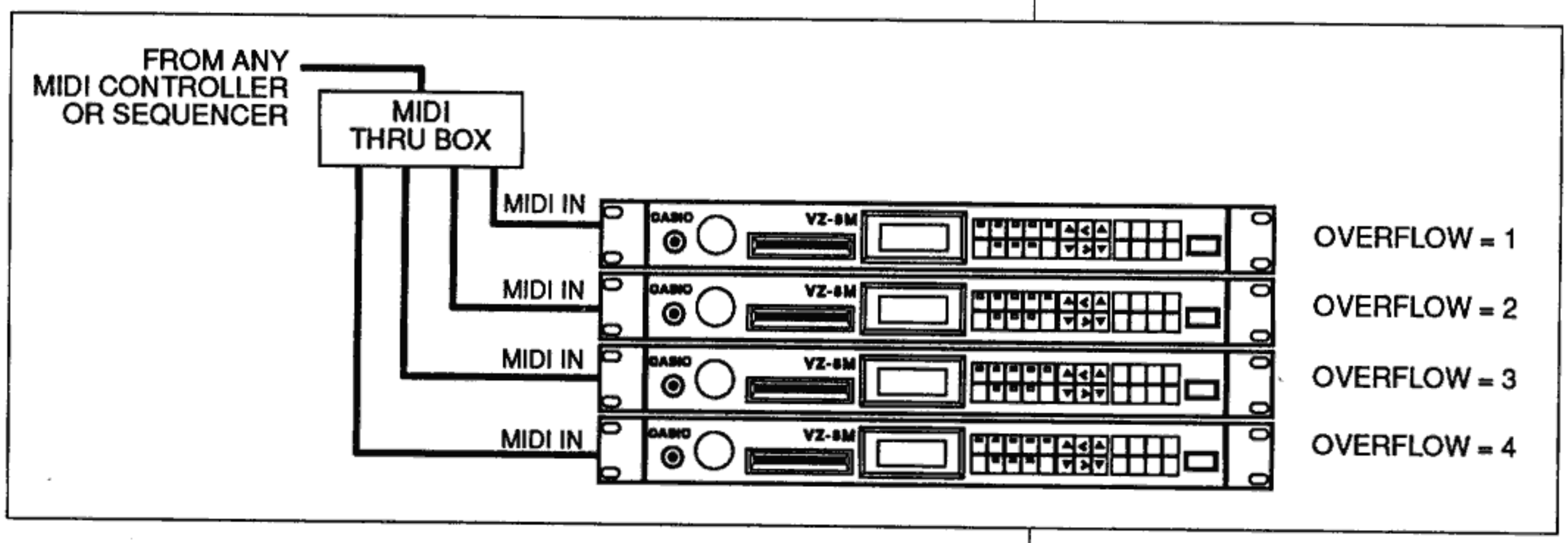
KEY ASSIGN	POLYPHONY	
	VZ-1 & VZ-10M	VZ-8M
1 VOICE	16	8
2 VOICE	8	4
3 VOICE	4	2
4 VOICE	4	2
8 VOICE	–	1
MULTI	16	8

MIDI Overflow

Although a single VZ-8M is limited to eight-note polyphony, you can use its overflow mode to extend the polyphony of a VZ-1, VZ-10M, or other VZ-8Ms when they are linked in a MIDI system. Each VZ-8 can add eight additional voices to the total polyphony of a system. The maximum extended polyphony is 64 voices.

32-note polyphony for VZ-1 or VZ-10M





32-note polyphony for VZ-8M

In order to get the best results with the overflow mode, follow these simple steps:

- Be sure to have the same voice and operation data in each instrument. If you are using RAM or ROM cards, you can load the contents of the card into the internal memory of each instrument, or use the MIDI *Load* and *Save* functions to transfer the desired voices and operation memories.
- If the system consists of two or three VZs, you can connect them via their built-in THRU ports. If you have four or more VZs, you'll get the best results by routing MIDI data through a MIDI THRU box.
- Since the VZ-1 and VZ-10M don't have an overflow mode, they should be first in the polyphony "chain." Set the overflow value of the first VZ-8 in the system to "3", set additional VZ-8Ms starting at "4".
- If the system consists of only VZ-8Ms, set the overflow value of each starting with "1".

Voice Functions

Although there is a slight difference in the organization of the voice parameter menus of the VZ-8M and the VZ-1/VZ-10M, the actual parameters are identical for each, and they are100% compatible when transferred via the card and MIDI *Save/Load* functions. The VZ-8M's voice parameter menu has one item not found on the VZ-1/VZ-10, "init voice". This allows you to create a "blank" initialized voice with a single button push. (On a VZ-1 or VZ-10M, you can create an initialized voice by making a copy of ROM memory H-8, "INIT VOICE".)

Effect Functions

There are several effect menu functions on the VZ-8M that are not available on either the VZ-1 or VZ-10M. The settings of these functions are stored as part of a VZ-8M operation memory.

- MIDI Channel: It is possible to store MIDI channel assignments as part of an operation memory. Wind mode and Keyboard mode operation memories store a single channel value. Guitar mode operation memories store a range of six channels (one for each string). Multi mode operation memories store eight channels (one for each area).
- Velocity Table Select: The VZ-8M has eight global velocity curves, in addition to the individual curves for each module in a voice. These global curves help to optimize the unit's response to velocity from different types of wind, guitar and keyboard controllers.
- Pan: The VZ-8M has three stereo panning functions not found on the VZ-1/VZ-10M: fix, control, and auto. (We'll show you how to simulate these on your VZ-1 or VZ-10M, as well as how to setup many other stereo effects on any VZ synthesizer. Be sure to read *Stereo Effects* in Part 3.)
- Total Vibrato: The VZ-8M has a separate set of vibrato parameters (wave, depth, rate, delay and multi) that can be applied globally to all voices in a layered combination.
- Total Tremolo: The VZ-8M has a separate set of tremolo parameters (wave, depth, rate, delay and multi) that can be applied globally to all voices in a layered combination.
- Operation Tune: The VZ-8M can store a separate tuning/transposition with each operation memory.

Eight Layer Key Assign

The VZ-8M has one more key assign configuration than the eight found on the VZ-1 and VZ-10M. This additional configuration allows eight voices to be layered to a single note. This can be particularly useful when controlling the VZ-8M from a wind controller.

Performance Modes

The VZ-8M has three performance modes used to match its response to different types of MIDI controllers: Keyboard, Wind and Guitar. The VZ-1 and VZ-10M have only the Keyboard mode.

- Keyboard mode: This is the "Normal" performance mode, most useful when controlling the VZ-8M from a keyboard or sequencer.
- Wind mode: This mode is designed for use with wind controllers. The VZ-8M's response to after touch (breath pressure) is modified to be more sensitive to pressure changes at the low end of the scale. This ensures that notes will be heard even when very little breath pressure is used – minimizing delays on the beginning of notes.
- Guitar mode: This mode is designed for use with MIDI guitar controllers that utilize MIDI mode 4, omni off/mono (or just "mono"). In this mode, each string transmits on a separate MIDI channel, making it possible to have independent pitch bend on each string. You can play in Combination or Normal mode on the VZ-1 and VZ-

10M with a MIDI guitar that uses MIDI mode 3, omni off/poly (or just "poly"). In this case, however, pitch bend will be global. The PG-380 MIDI guitar can operate in either mode.

Memory Compatibility

Voice and operation memory data may be transferred freely between the three types of VZ synthesizers using the save/load functions of the effects menu. The data may be saved or loaded using RAM cards, transferred directly between two VZs via MIDI, or transferred to and from a computer by using appropriate MIDI software. In all three types of VZs, the voice data is 100% compatible. A voice created on one will be exactly the same when transferred to any of the others. The VZ-8M has more effect menu functions than the VZ-1 and VZ-10M. The settings for these additional functions are saved and recalled only as part of the operation memory of the VZ-8M. When an operation memory created on a VZ-1 or VZ-10M is loaded into to a VZ-8M the additional functions are automatically intialized to the factory default values. The additional functions are not transferred when an operation memory created on a VZ-8M is loaded into to a VZ-1 or VZ-10M.

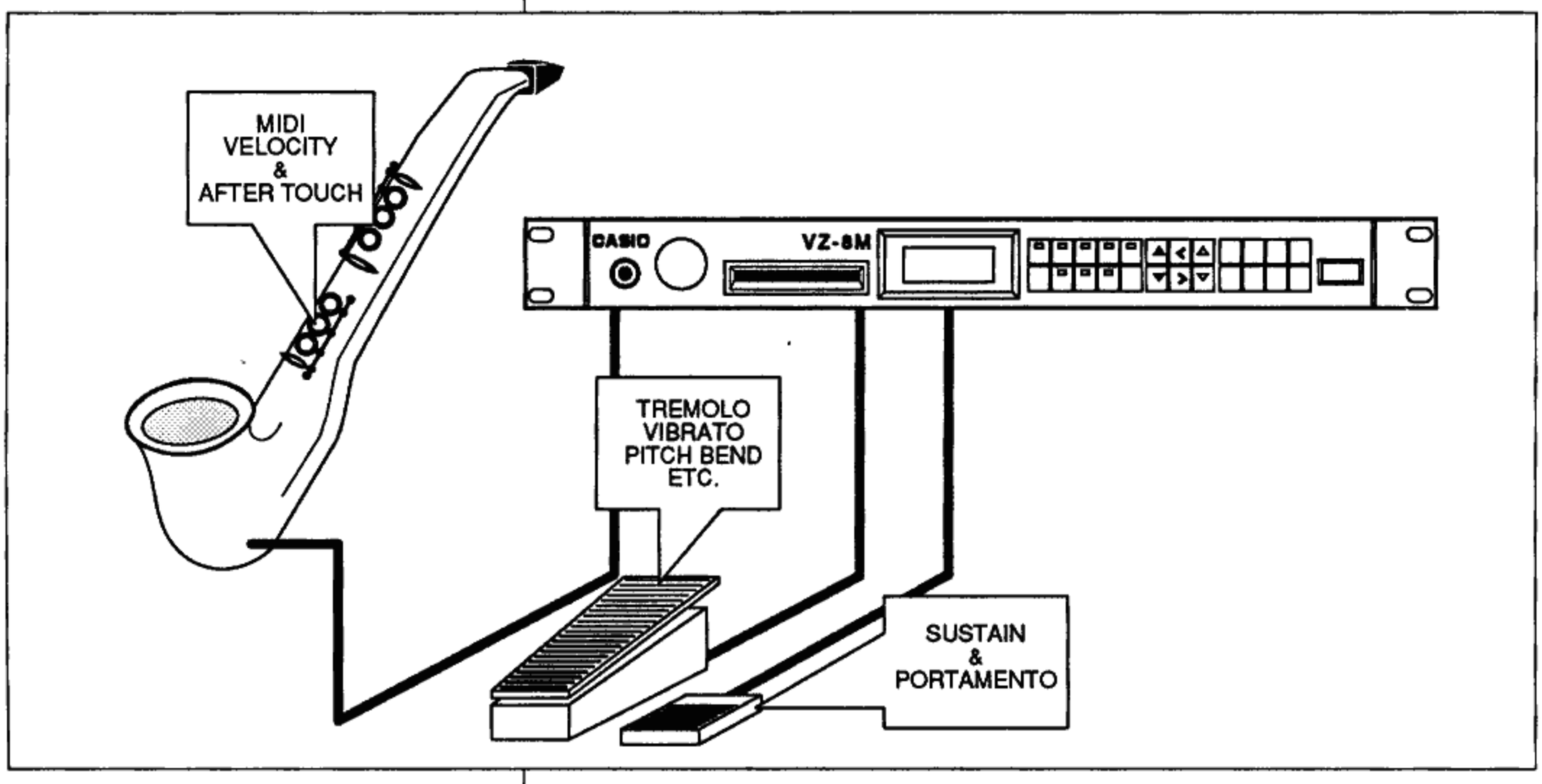
Using VZ Synthesizers with the MIDI Horn and Other MIDI Wind Controllers

VZ synthesizers were designed with more than keyboard control in mind. Such features as flexible routing of MIDI velocity, after touch, and MIDI controllers, combination mode split and layered keyboards, and iPD sounds make any VZ an excellent choice as a MIDI tone module for any wind controller. Several VZ-8M voices were designed specifically for wind control. (These sounds show a "W" in the performance mode display.) Although most of the preset VZ sounds were designed to be played from a standard keyboard, it's not difficult to edit any sound to respond musically to a wind controller. In the following section, we'll show you how to customize sounds for wind control on all VZ synthesizers, as well as how to set up the VZ-8Ms special wind performance mode.

Adding Wind Controller Dynamics to VZ Sounds

MIDI wind controllers, like the DH-200, translate breath pressure into two sources of dynamic control—velocity and after touch. For example, on the DH-200 velocity is determined by how hard you are blowing at the instant you play a new note, and after touch is determined by the amount of breath pressure you use as you continue to blow into the mouth piece of the controller. The trick to creating dynamic wind controller voices is to use velocity and after touch to control the loudness / timbre of a sound.

Use velocity alone to control loudness and timbre changes for non-wind instrument sounds like piano, vibes or guitar with natural dynamics. Use after touch to control effects like pitch bend, vibrato, or tremolo. Use after touch alone to control loudness and timbre for wind instrument sounds like sax, flute or trumpet with natural dynamics.

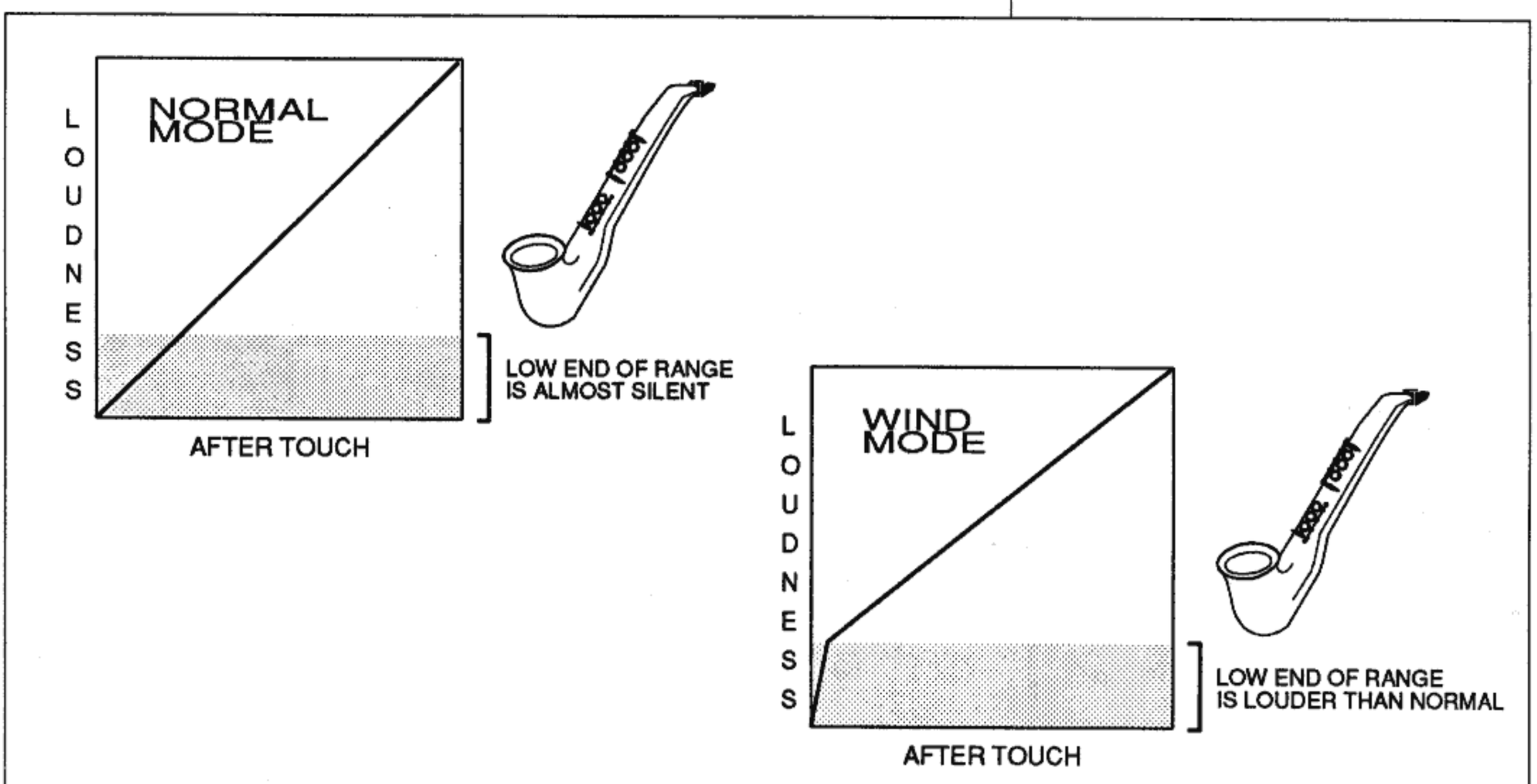


Here are guidelines for customizing voices for dynamic wind controller performances.

- If you want to control the dynamics of the sound with breath pressure, you must use after touch to control loudness or timbre. For the smoothest dynamics Casio recommends setting the AFTER TOUCH sensitivity values between "92" and "99". Set A ENV BIAS to "on" and all other after touch options to "off".
- The AMP SENS parameter determines which modules will respond to after touch (breath pressure). This parameter acts like a "balance control" between velocity and pressure changes. The range for this parameter is 0-7. At "0", velocity has maximum effect; after touch has none. At "7", after touch has maximum effect; velocity has none. The higher the value, the more the output of the module will change with after touch. For the widest possible dynamics use "7". If you don't want a module to change with after touch, use "0". (See Part 2: *Finding Your Way Around a VZ Sound* to determine which modules to control for loudness or timbre changes.)
- Solo: If the voice has any kind of release (it continues to "ring" after you stop playing a note), set the solo function to "on". This makes the sound monophonic (only one note will sound at a time). If you leave the solo function off, notes with long release will overlap.
- You can control effects like vibrato, tremolo, and pitch bend with the VZ's Foot VR pedal.

Using the VZ-8M Wind Performance Mode

The VZ-8M has a Wind performance mode, designed to get the most out of MIDI wind controllers that translate breath pressure to MIDI after touch. When the VZ-8M is in Wind performance mode, its response to after touch is scaled differently than for keyboard-generated after touch. This scaling makes the VZ-8M more sensitive to changes on the low end of the after touch scale. This makes it possible to produce tones with very little breath pressure, while still retaining a wide range of dynamic expression.



Here's how to activate the Wind mode on the VZ-M:

1. Make sure that the wind controller is set to transmit breath pressure as after touch.
2. Be sure the VZ-8M is set to the same MIDI channel as your wind controller.
3. When playing the VZ-8M in Normal mode, use the VALUE button to set the mode value to "W".

   When playing the VZ-8M in Combination mode, use the CURSOR button to select the mode value; use the VALUE button to set the value to "W".

Changing Operation Memories to the Wind Performance Mode

If you are using a wind controller to play your VZ-8M, you'll want to change the performance mode of many of its operation memories to the Wind mode. The performance mode is saved as part of the operation memory data. You can change the existing performance mode of an internal, or card operation, memory to Wind mode with some simple editing. You can re-save the operation memory with the Wind mode.

Here's how:

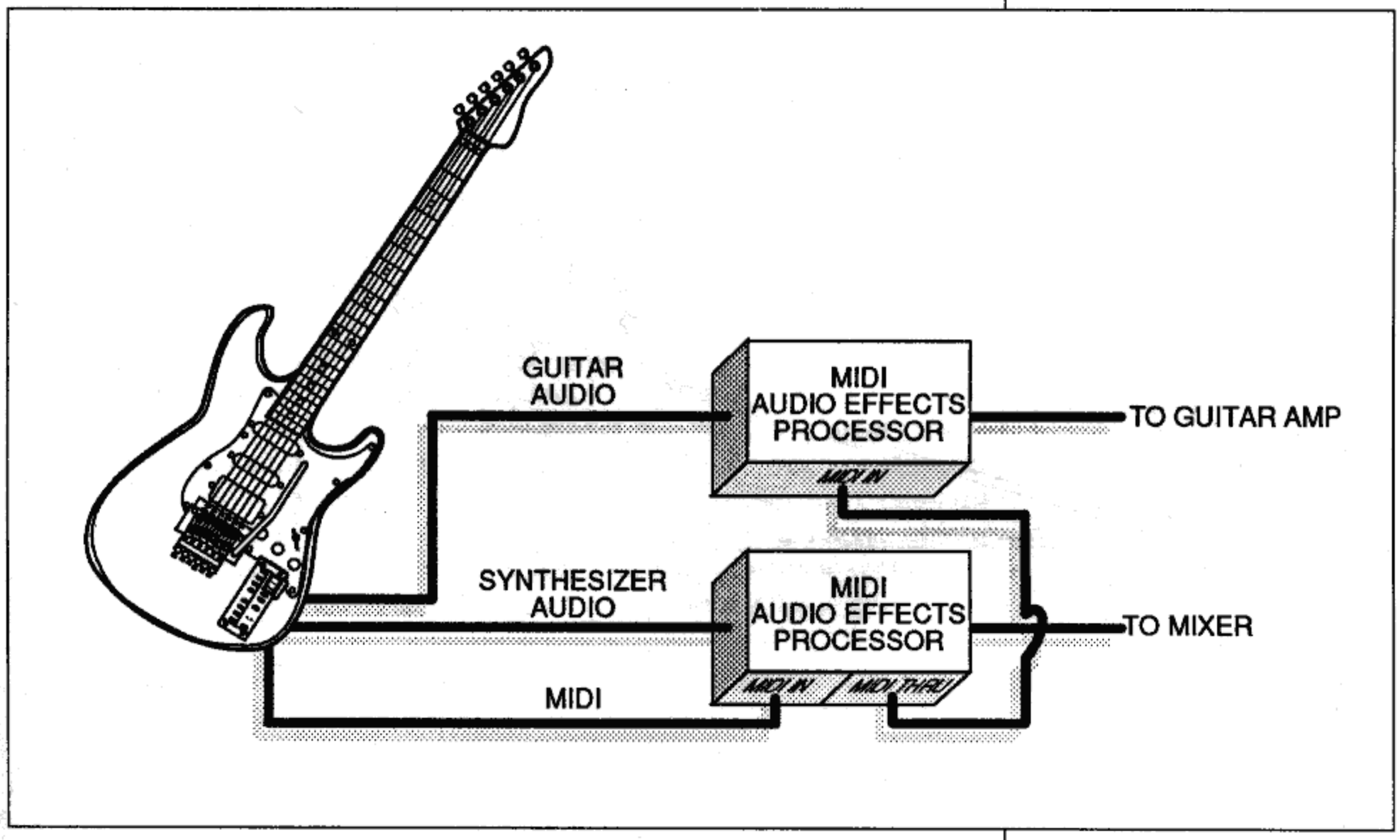
1. Select the operation memory you want to change.
2. Transfer it to the combination work area by holding down the WRITE button and pushing the COMBINATION button.
3. Use the CURSOR button to select the mode value.
4. Use the VALUE button to set the value to "W".
5. Save the edited combination to an internal or RAM card operation memory.

Using VZ Synthesizers with the PG-380 and other MIDI Guitar Controllers

Casio's PG-380 is a stand-alone guitar synthesizer. It has a complete VZ synthesizer built into the guitar. In addition to the audio outputs for the guitar and synthesizer, it has a MIDI OUT jack that allows you to use it as either a "mono mode" or "poly mode" guitar. Any VZ synthesizer can be used effectively as a MIDI tone module for the PG-380, or any other MIDI guitar. Since voices created on any VZ can be loaded into the PG-380's internal synthesizer via RAM Cards, they also make excellent "sound design labs" for the PG-380. Before we get into the use of VZs as MIDI tone modules, let's check out the PG-380.

Using the PG-380 as a MIDI Effects Controller

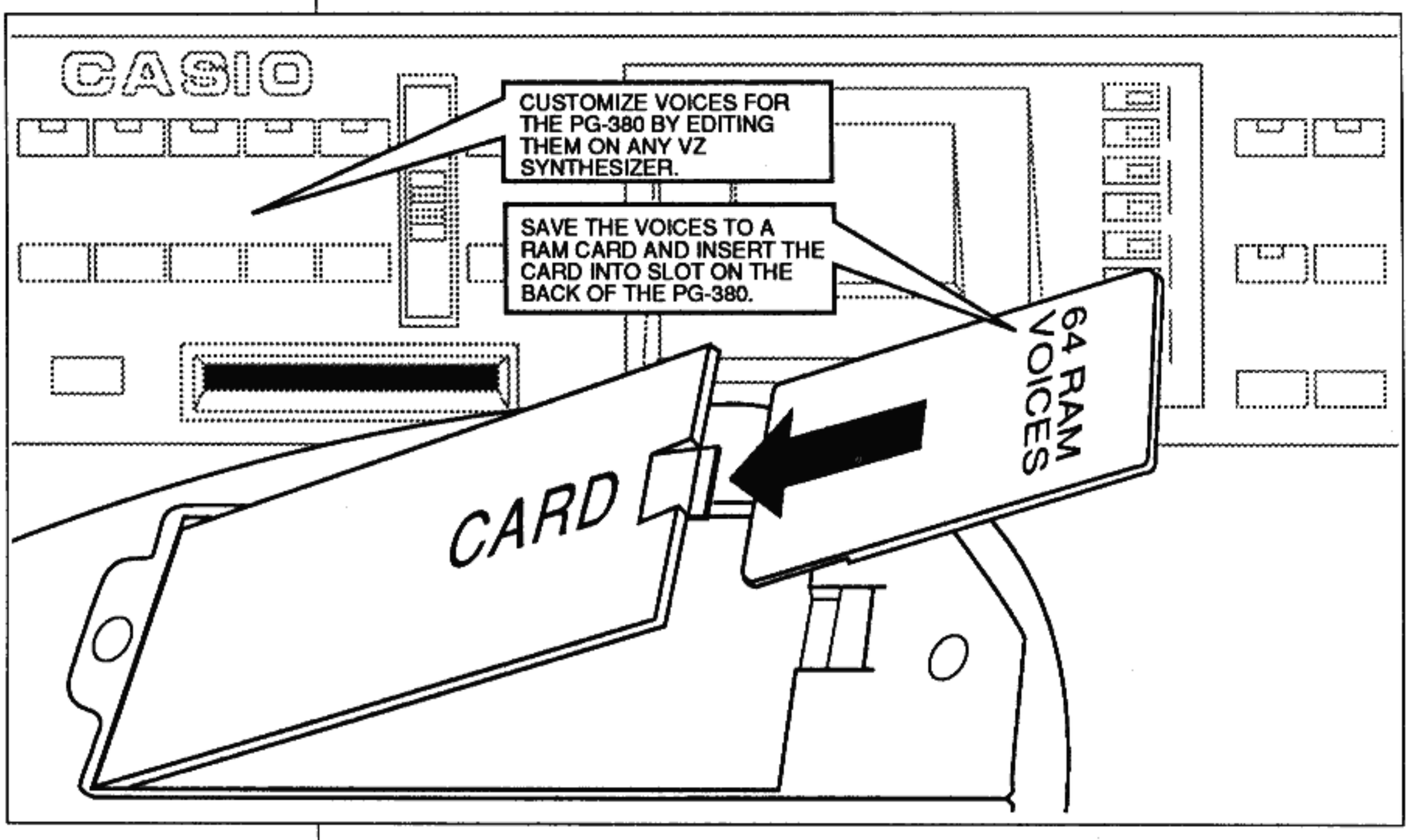
The PG-380 is a full featured electric guitar with a built-in VZ synthesizer. There is no need to connect to an external MIDI module to produce synthesized sounds from the guitar. If you use the PG-380 as a stand alone guitar/synthesizer, you can use its MIDI output to control programmable MIDI audio effects. For example, you can use the program keys to select different setups on a MIDI controlled guitar effects device, or to select different reverb/delay effects for synthesizer voices.



Customizing RAM Card Voices for the PG-380

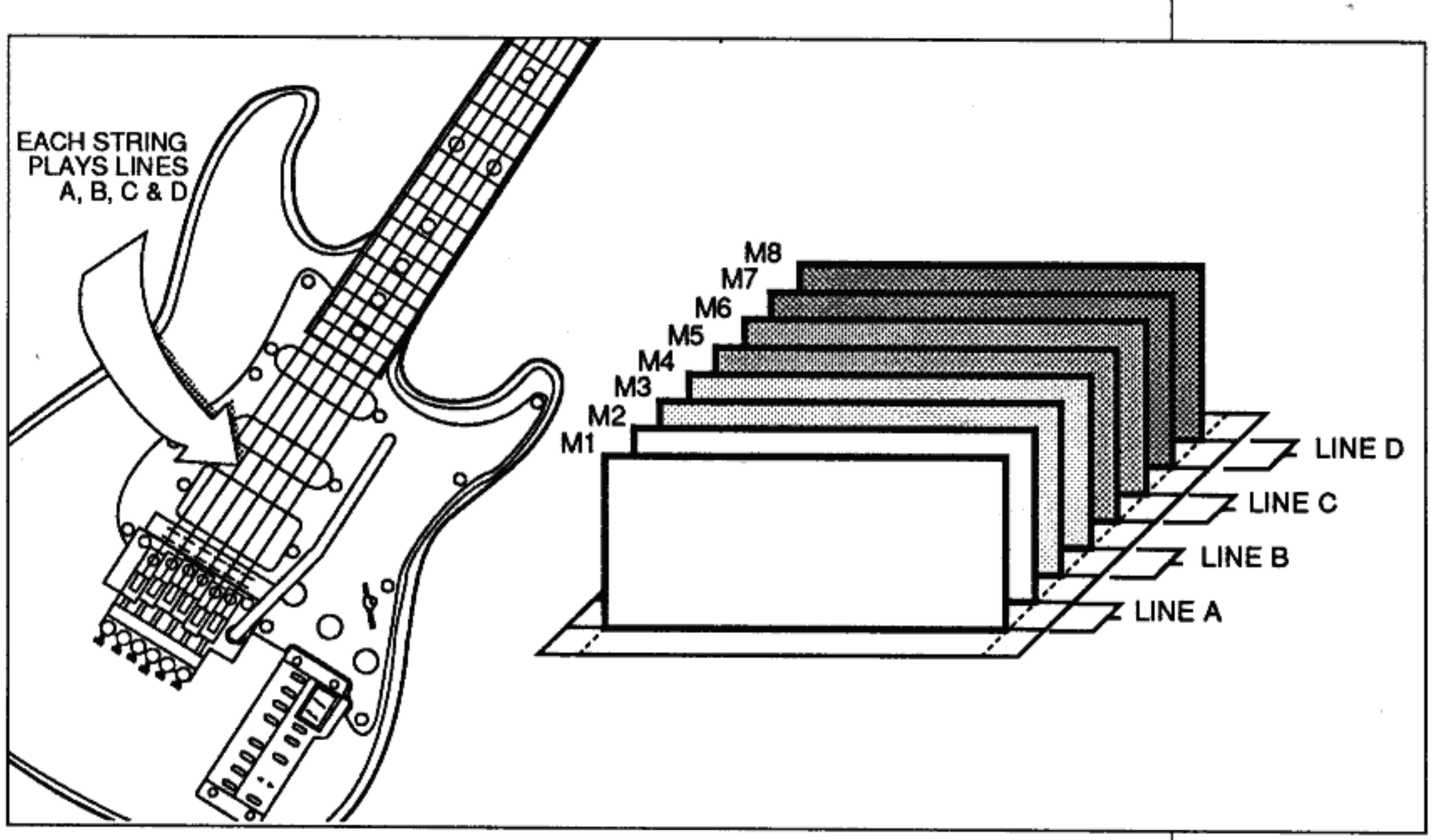
You cannot alter or edit the internal sounds in the PG-380's internal synthesizer. You can, however, create any number of new sounds for the PG-380 with a VZ-1, VZ-10M or VZ-8M. You can play these new sounds with the PG-380 by saving them to a RAM card, and then inserting the card into the slot in the back of the guitar. You'll find that the internal synthesizer tracks guitar playing slightly faster than a MIDI tone module does — so for things like intricate finger picking and flashy leads, you may want to load your VZ voices into the PG-380 and play them from its internal synthesizer.

Even though the internal synthesizer can only play "normal" VZ patches (a single synthesizer voice consisting of eight iPD modules), with some careful editing you can create sounds with many of the effects used in combination patches. For example, you can create positional splits, layers (more than one sound per note) and cross-fades (independent sounds assigned to separate pitch areas), and velocity splits, layers and cross-fades (independent sounds assigned to different picking velocities). We'll give you several specific examples showing you how to create these effects and more in Part 3, but right now we'll show you the basic concepts behind creating customized PG-380 voices with a VZ.



Layered Sounds within a Single Voice

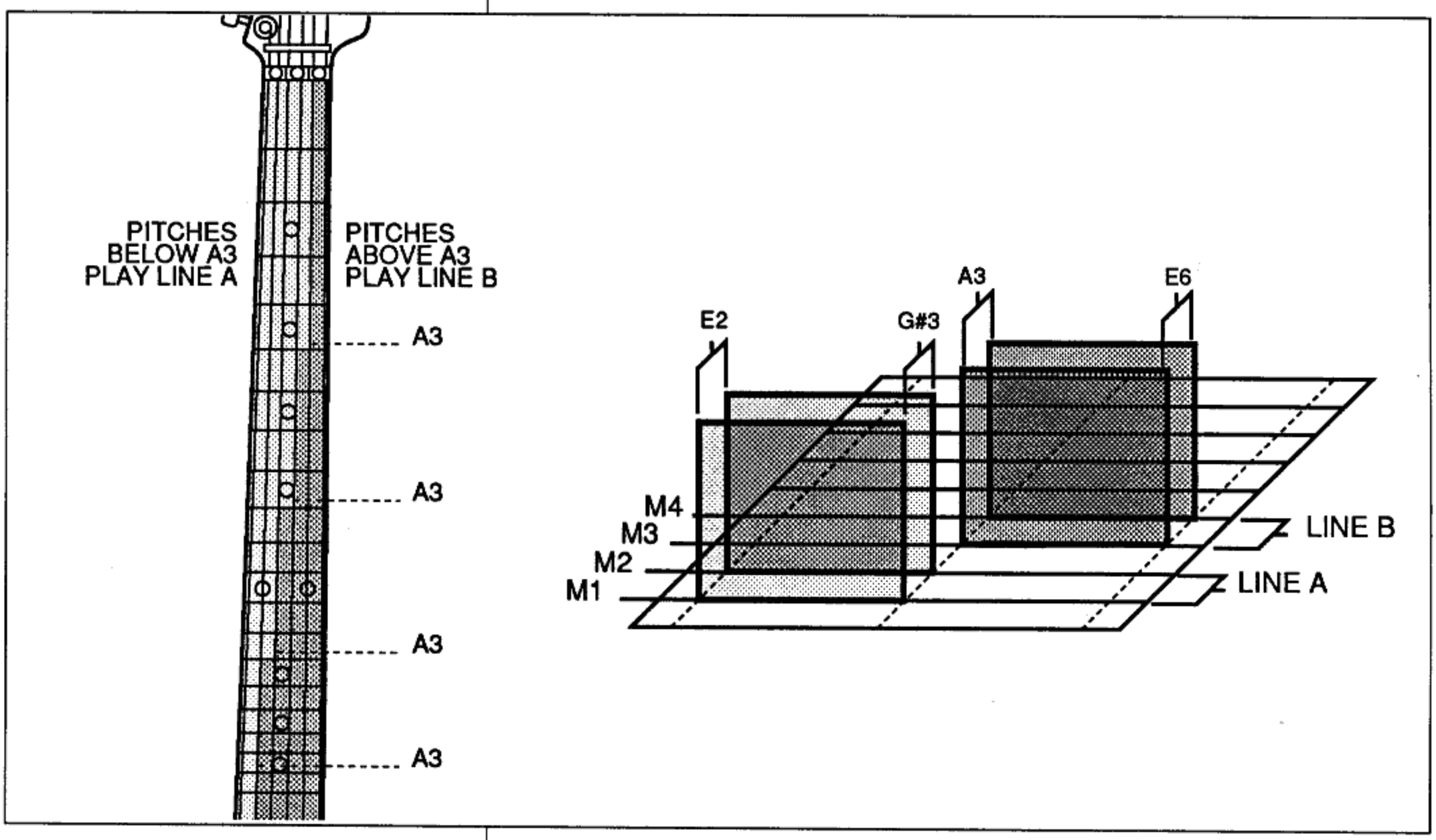
A VZ synthesizer voice is made up of four pairs of sound modules called *lines*. Each line can be programmed to produce a completely different sound from the others. This makes it possible to create a voice on the PG-380 with four totally different sounds *on each string*. You could, for example, create a voice with organ, flute, vibes, and synth lead sounds layered together. To create layered sounds with a single VZ voice, program two or more lines so that each produces a completely different type of sound. We'll show you how in the next two sections of this book.



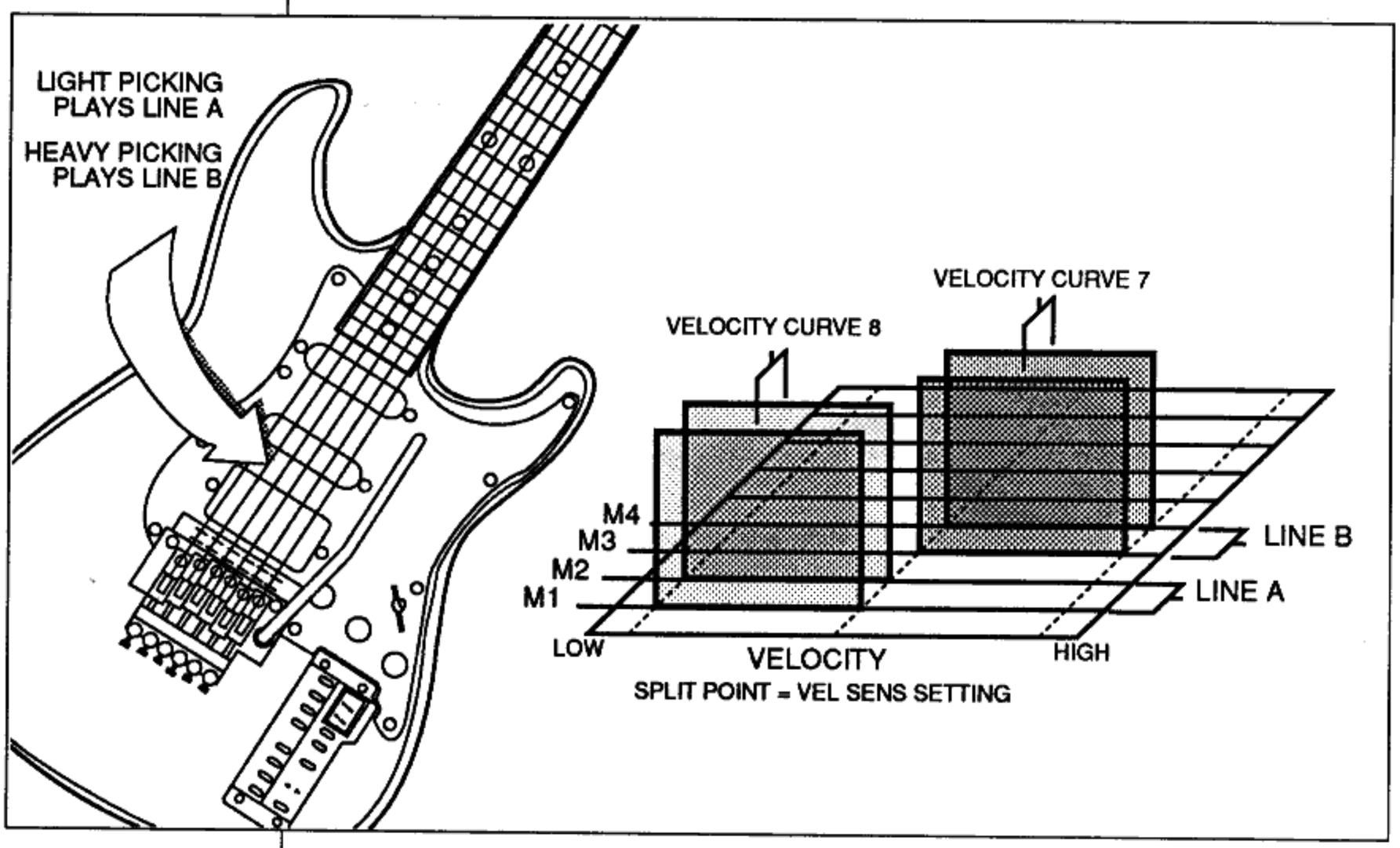
Split and Cross-fade Sounds within a Single Voice

Not only can you create voices with two or more layered sounds, you can set up splits and cross-fades for the sounds in the layer. You can create two types of splits: pitch split or velocity split. (See illustrations on the following page.) In a pitch split sound, the pitch you play determines which sound you hear. For example, notes below middle C play bass, and those above middle C play flute. In a velocity split sound, the velocity of your picking determines the sound you will hear. For example, low velocities play jazz guitar, and high velocities play distortion guitar. You can set up a cross-fade with both pitch and velocity splits. This allows the two sounds to blend together near the split point. We'll go over these programming techniques in detail in Parts 2 and 3. Here are some guidelines for these effects.

- To create split sounds with a single voice, program two or more lines to produce different sounds (the same idea as layering), then use "KF level (DCA)" to create pitch zones for each sound in the split.
- Depending on how you set the level parameter, you can create either hard splits (an abrupt change from sound to adjacent sound) or cross-fades (adjacent sounds overlap).
- To create velocity splits use "Vel level (DCA)" to setup inverse curves for the different voices in the split. For hard splits, use curves 7 and 8. For velocity cross-fades, use curves 3 and 4.



Single Voice Pitch Split



Single Voice Velocity Split

Modulation and Portamento Effects for PG-380 Voices

Modulation effects like vibrato and tremolo can really add life to many synthesizer sounds. In sounds designed for keyboard performance, the strength of these effects are usually controlled with a wheel, after touch or foot pedal. This allows the performer to bring the effect in and out freely while playing.

No modulation effects will be heard in voices that use wheels or pedals to control their strength when they are played by the PG-380's internal synthesizer. With some careful editing, however, you can customize any voice to produce modulation effects when played by the internal synthesizer.

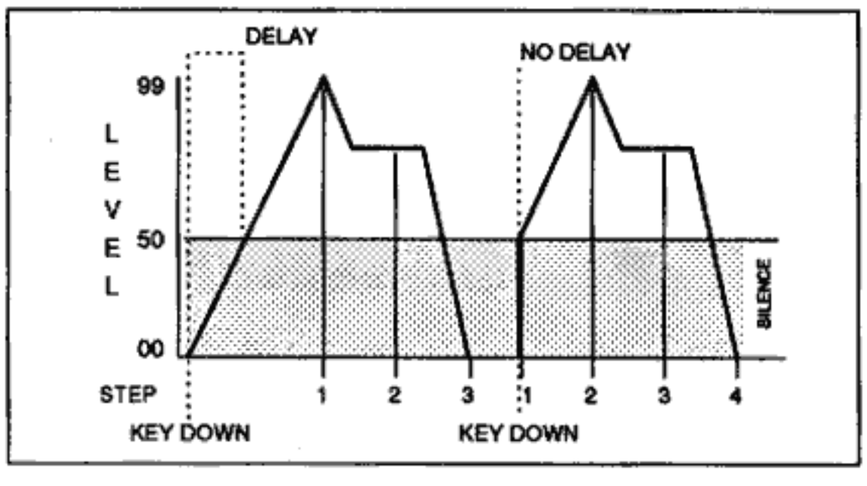
- Vibrato: To hear vibrato effects when you play the PG-380, set the vibrato depth parameter to a value greater than "0". (Higher values create stronger modulation effects — try values between "10" and "35".) Unless you want the effect to be constant, and heard for the entire duration of each note, use the vibrato delay parameter to slowly fade-in the vibrato of each note.
- Tremolo: To hear tremolo effects when you play the PG-380, set the tremolo depth parameter to a value greater than "1". (Higher values create stronger modulation effects — try values between "10" and "35".) Unless you want the effect to be constant, and heard for the entire duration of each note, use the tremolo delay parameter to slowly fade-in the tremolo of each note.

The portamento effect, a smooth sliding pitch change from note to note, is generally turned on and off with a footswitch on a keyboard synthesizer. If you want to create portamento effects for PG-380 voices, you must edit the portamento time parameter to a value greater than "0". (Higher values create slower portamento rates.) When the voice is played by the internal synthesizer, the portamento effect will be active all of the time. There is a much more natural way to produce portamento effects with the PG-380 — simply play the guitar with a slide or bottle neck. You'll find that the internal synthesizer tracks the sliding notes perfectly!

Optimizing Envelopes for Improved Tracking

Guitar control of synthesizer voices will feel most natural if you hear sound as soon as you pick a string. Many sounds with soft attacks — strings, flutes, etc. have a slight delay built into their envelope settings. To optimize the playability of sounds with slow attacks, follow these guidelines:

- Find the loudness modules in the sound.
- Shift the slow attack portion of the envelopes for these modules from step 1 to step 2 of the envelope.
- Set the rate for step 1 for the quickest attack (99).
- Set the level for step 1 to a point where you can just barely hear the sound when it is triggered (approximately 50).

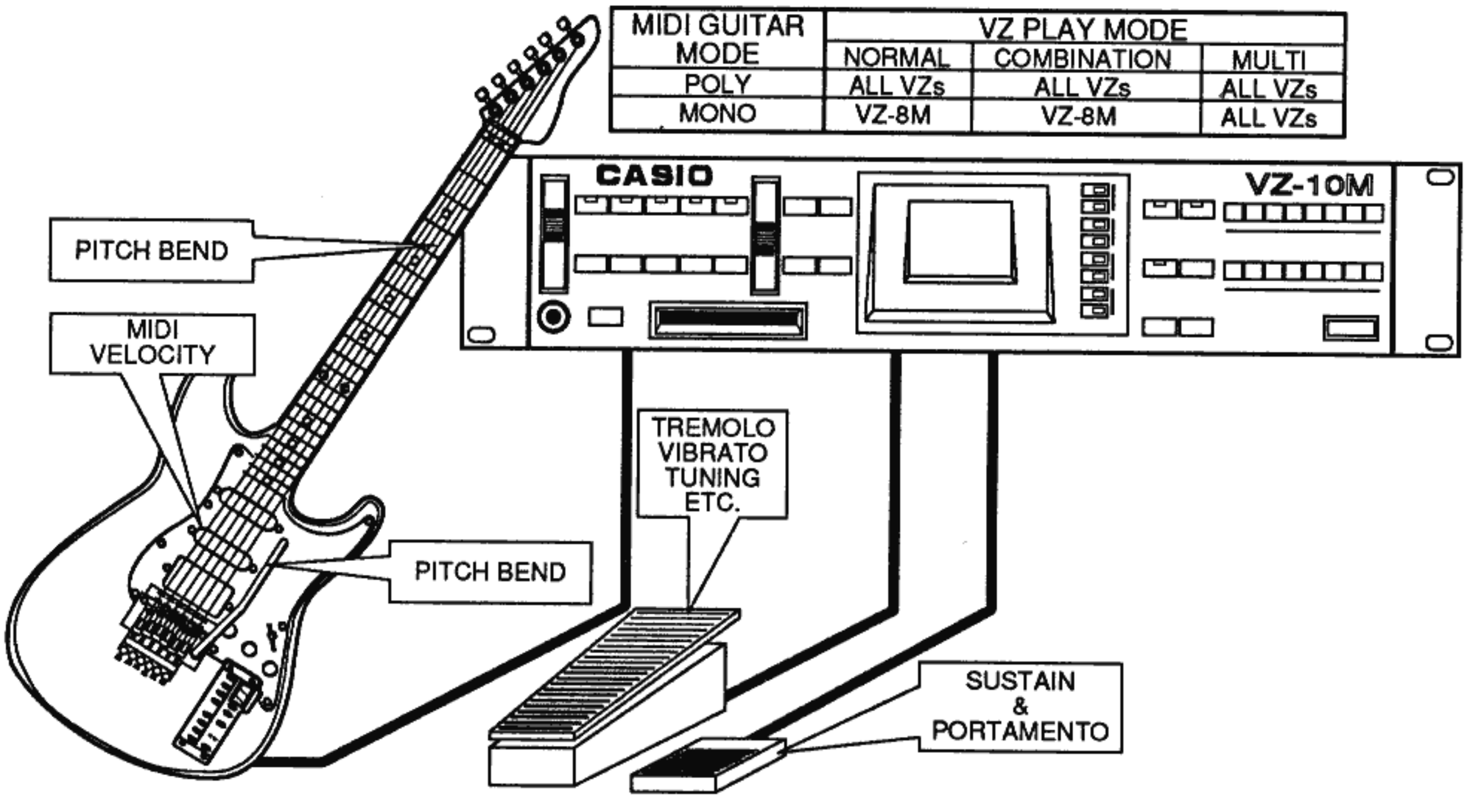


Playing VZ Synthesizers with a PG-380 or other MIDI Guitar

The powerful MIDI features built into the VZ line of synthesizers make them ideal as tone modules for MIDI guitar controllers like the PG-380. There are two MIDI modes commonly used by guitar controllers. "Poly" mode controllers transmit note messages for all of the strings on one MIDI channel. "Mono" mode controllers transmit each string on a separate MIDI channel. All VZ synthesizers can function in either mode. What's more, the VZ-8M also has a special guitar performance mode that further enhances its capabilities as a MIDI guitar tone module. Here are some of the things that are possible with a VZ/MIDI guitar system.

- Each string of a mono mode controller can independently control a different voice by using the VZ's Multi mode. (The voice for each string can, in turn, be a composite sound with its own splits, layers and cross-fades.)
- Unlike many synthesizers, the pitch bend range of VZ synthesizers can be set to two or more octaves. This allows a VZ to accurately track slide or bottle-neck glides of more than 12 frets, as well as even the most radical use of the tremolo bar.
- The outputs of areas 1-4 are sent to the left output jack; areas 5-8 are sent to the right output jack. This makes several different stereo "mixes" and effects possible.
- Since the Multi mode is made up of eight separate MIDI areas, it's possible to use the two extra areas to "double up" on one or two strings, or even to use them to play back sequencer tracks to accompany your guitar playing in real-time.
- You can play the keyboard of a VZ-1 with ten-note polyphony (in stereo) *at the same time* it is being used as a guitar tone module.
- Poly mode guitar controllers can play the VZ's Normal and Combination sounds with all six strings. This gives the guitarist access to advanced VZ sound features like stereo effects, combination patches, velocity switch and cross-fades, and more.
- The guitar performance mode of the VZ-8M allows mono mode controllers to play Normal and Combination voices with all six strings, while retaining independent pitch bend for each string.
- You can add modulation and other dynamic effects with the VZ's VR foot pedal.
- Sustain and portamento effects can be controlled with the VZ's footswitch.

MIDI GUITAR MODE	VZ PLAY MODE		
	NORMAL	COMBINATION	MULTI
POLY	ALL VZs	ALL VZs	ALL VZs
MONO	VZ-8M	VZ-8M	ALL VZs

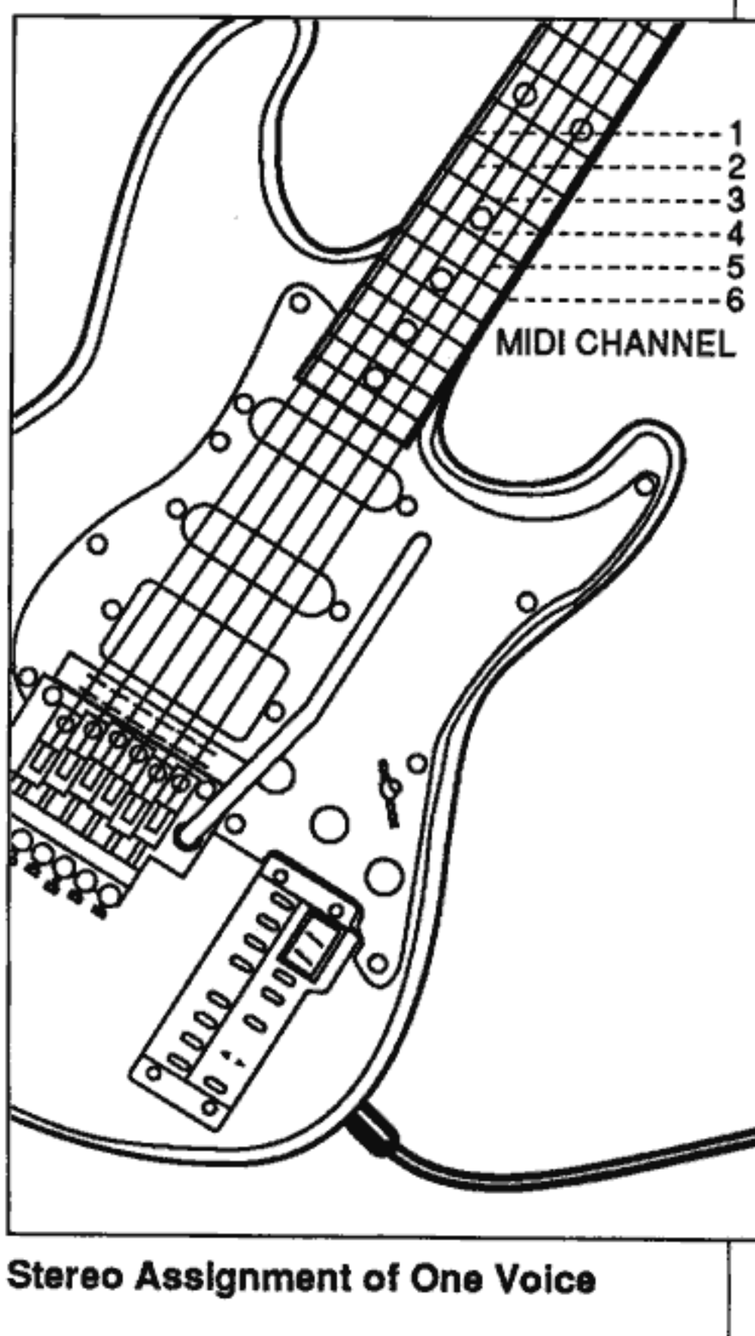


About Pitch Bend

If you plan to use a slide, bottle-neck, or tremolo bar when playing a PG-380 or other guitar controller, set the pitch bend range parameter to "24". This will allow the VZ to track the pitch changes even if you slide the entire length of the neck, or depress the tremolo bar to its limit. Note that when the PG-380 is in the poly mode, pitch bending will track slides only when a single string is sounding. When more than one string is sounding, pitch bend will track in half-steps. When the PG-380 is set to the mono mode, pitch bending will always track slides no matter how many strings are sounding.

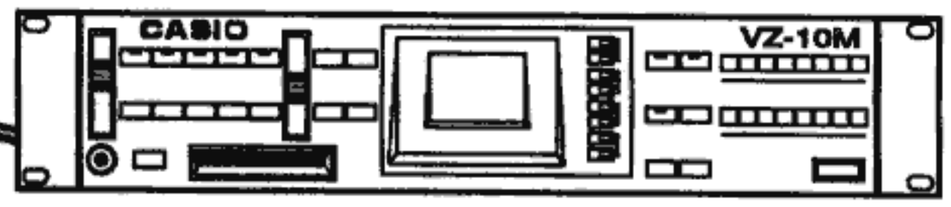
Using the Multi mode with Mono mode Guitar Controllers

The VZ's multi mode, with its eight separate MIDI areas, is ideal for use with mono mode guitar controllers. The following diagrams show examples of different ways to use the multi mode with a guitar controller

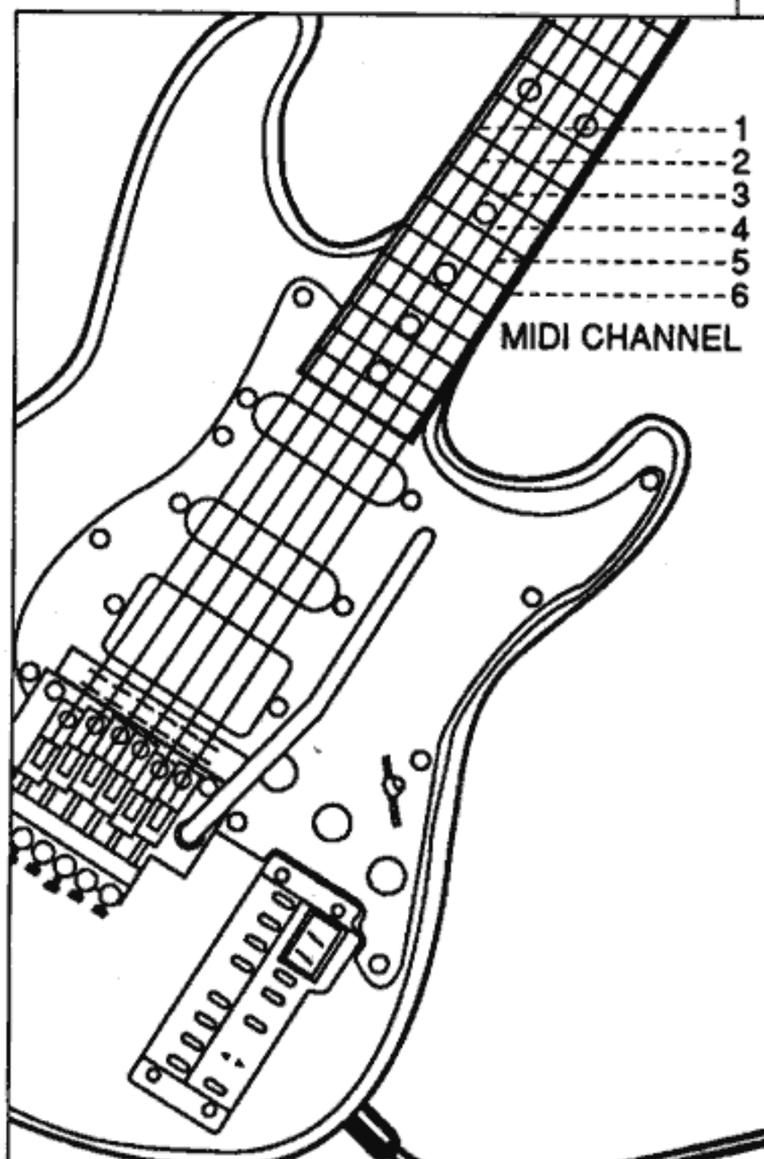


OUTPUT 1 (LEFT)			
AREA 1	AREA 2	AREA 3	AREA 4
MIDI CHAN = 1	MIDI CHAN = 2	MIDI CHAN = 3	MIDI CHAN
VOICE = GUITAR	VOICE = GUITAR	VOICE = GUITAR	VOICE
NOTE = 1	NOTE = 1	NOTE = 1	NOTE = 0
PITCH = + 0	PITCH = + 0	PITCH = + 0	PITCH

OUTPUT 2 (RIGHT)			
AREA 5	AREA 6	AREA 7	AREA 8
MIDI CHAN = 4	MIDI CHAN = 5	MIDI CHAN = 6	MIDI CHAN
VOICE = GUITAR	VOICE = GUITAR	VOICE = GUITAR	VOICE
NOTE = 1	NOTE = 1	NOTE = 1	NOTE = 0
PITCH = + 0	PITCH = + 0	PITCH = + 0	PITCH

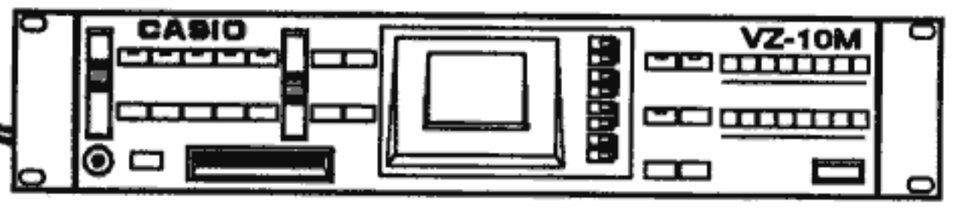


Stereo Assignment of One Voice

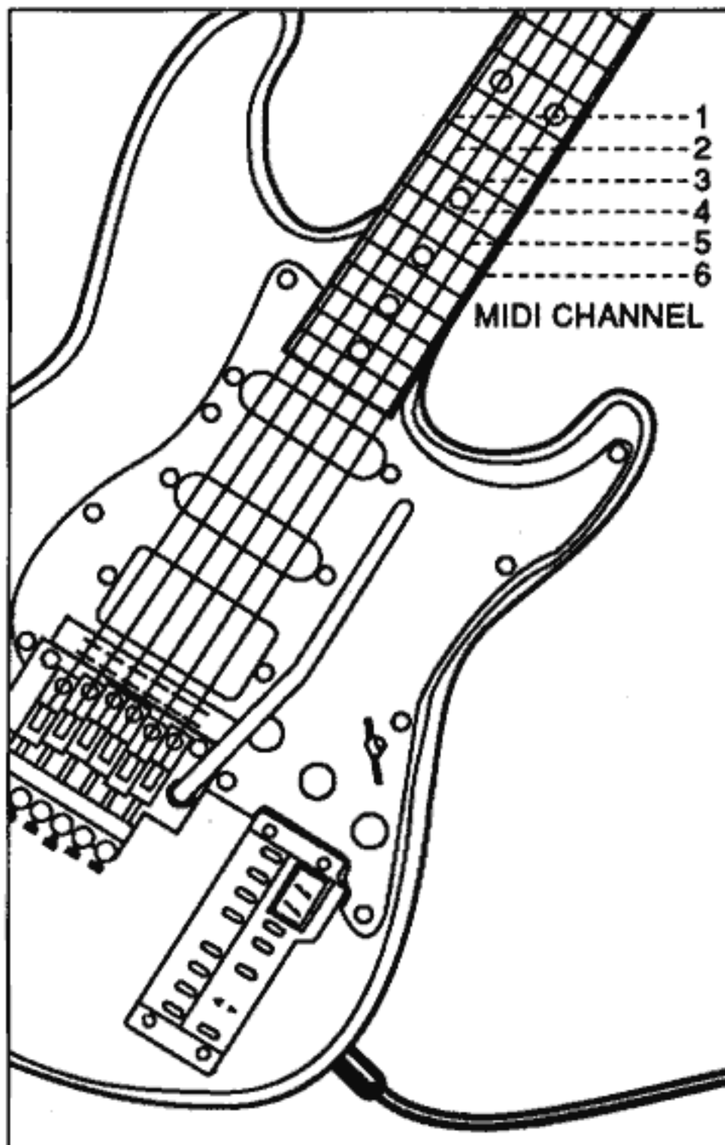


OUTPUT 1 (LEFT)			
AREA 1	AREA 2	AREA 3	AREA 4
MIDI CHAN = 1	MIDI CHAN = 2	MIDI CHAN = 3	MIDI CHAN
VOICE = BASS	VOICE = 'BONE	VOICE = CELLO	VOICE
NOTE = 1	NOTE = 1	NOTE = 1	NOTE = 0
PITCH = + 0	PITCH = + 0	PITCH = + 0	PITCH

OUTPUT 2 (RIGHT)			
AREA 5	AREA 6	AREA 7	AREA 8
MIDI CHAN = 4	MIDI CHAN = 5	MIDI CHAN = 6	MIDI CHAN
VOICE = FLUTE	VOICE = BRASS	VOICE = VIBES	VOICE
NOTE = 1	NOTE = 1	NOTE = 1	NOTE = 0
PITCH = + 0	PITCH = + 0	PITCH = + 0	PITCH

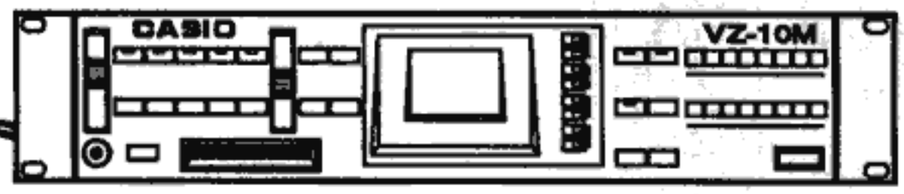


One Voice per String

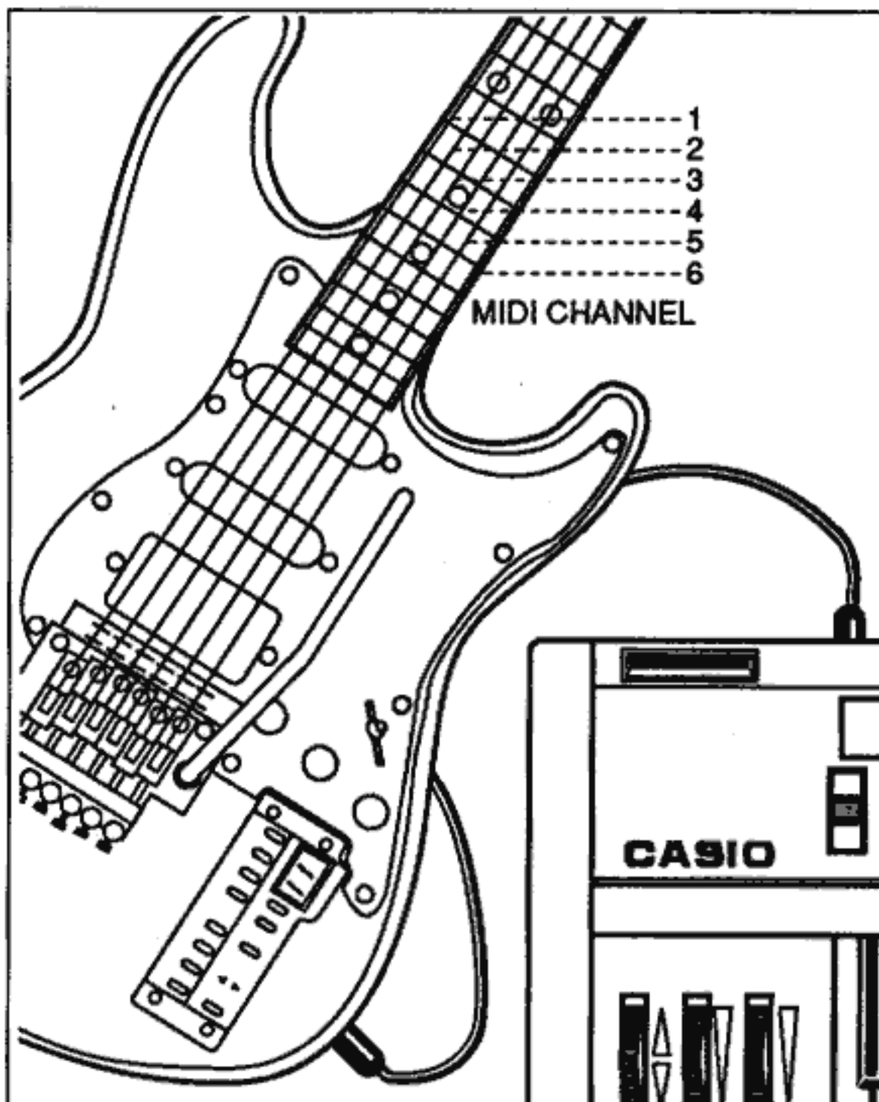


OUTPUT 1 (LEFT)			
AREA 1	AREA 2	AREA 3	AREA 4
MIDI CHAN = 1	MIDI CHAN = 1	MIDI CHAN = 2	MIDI CHAN =3
VOICE = BASS	VOICE = BASS	VOICE = GUITAR	VOICE =GUITAR
NOTE = 1	NOTE = 1	NOTE = 1	NOTE = 1
PITCH = + 0	PITCH = + 7	PITCH = + 0	PITCH = +0

OUTPUT 2 (RIGHT)			
AREA 5	AREA 6	AREA 7	AREA 8
MIDI CHAN = 4	MIDI CHAN = 5	MIDI CHAN = 6	MIDI CHAN = 6
VOICE = GUITAR	VOICE = GUITAR	VOICE = BRASS	VOICE = BRASS
NOTE = 1	NOTE = 1	NOTE = 1	NOTE = 1
PITCH = + 0	PITCH = + 0	PITCH = + 0	PITCH = +12

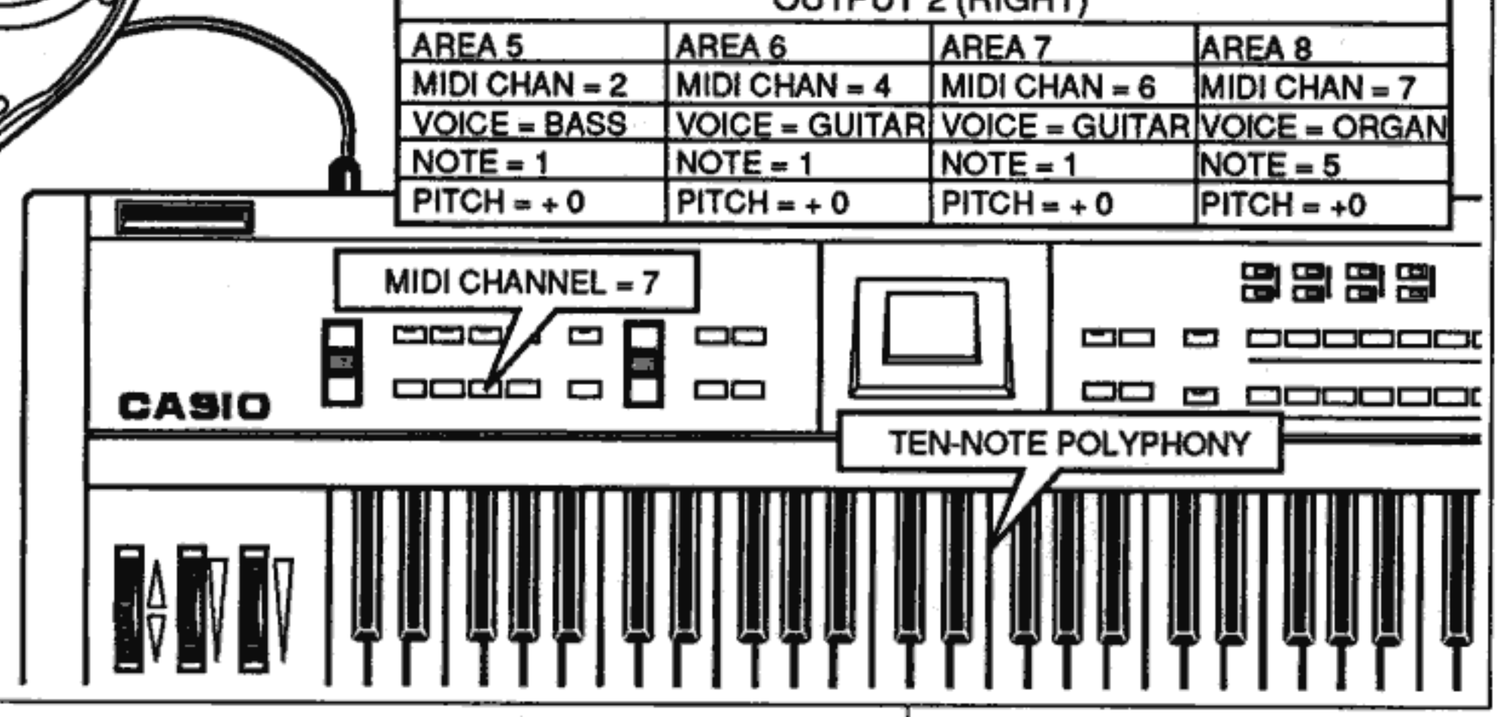


Doubled Voices on Top and Bottom String

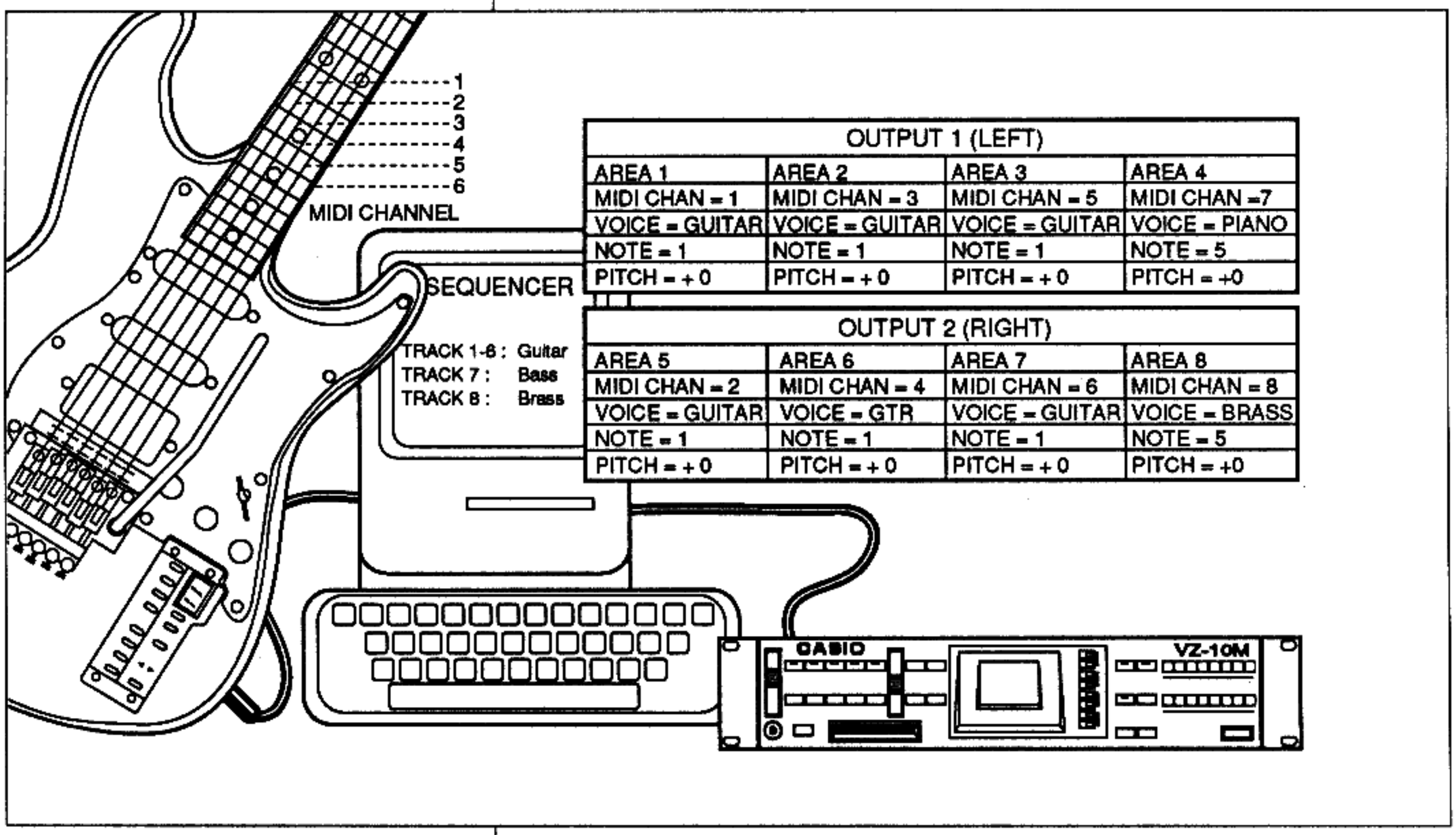


OUTPUT 1 (LEFT)			
AREA 1	AREA 2	AREA 3	AREA 4
MIDI CHAN = 1	MIDI CHAN = 3	MIDI CHAN = 5	MIDI CHAN =7
VOICE = BASS	VOICE = GUITAR	VOICE = GUITAR	VOICE = ORGAN
NOTE = 1	NOTE = 1	NOTE = 1	NOTE = 5
PITCH = + 0	PITCH = + 0	PITCH = + 0	PITCH = +0

OUTPUT 2 (RIGHT)			
AREA 5	AREA 6	AREA 7	AREA 8
MIDI CHAN = 2	MIDI CHAN = 4	MIDI CHAN = 6	MIDI CHAN = 7
VOICE = BASS	VOICE = GUITAR	VOICE = GUITAR	VOICE = ORGAN
NOTE = 1	NOTE = 1	NOTE = 1	NOTE = 5
PITCH = + 0	PITCH = + 0	PITCH = + 0	PITCH = +0



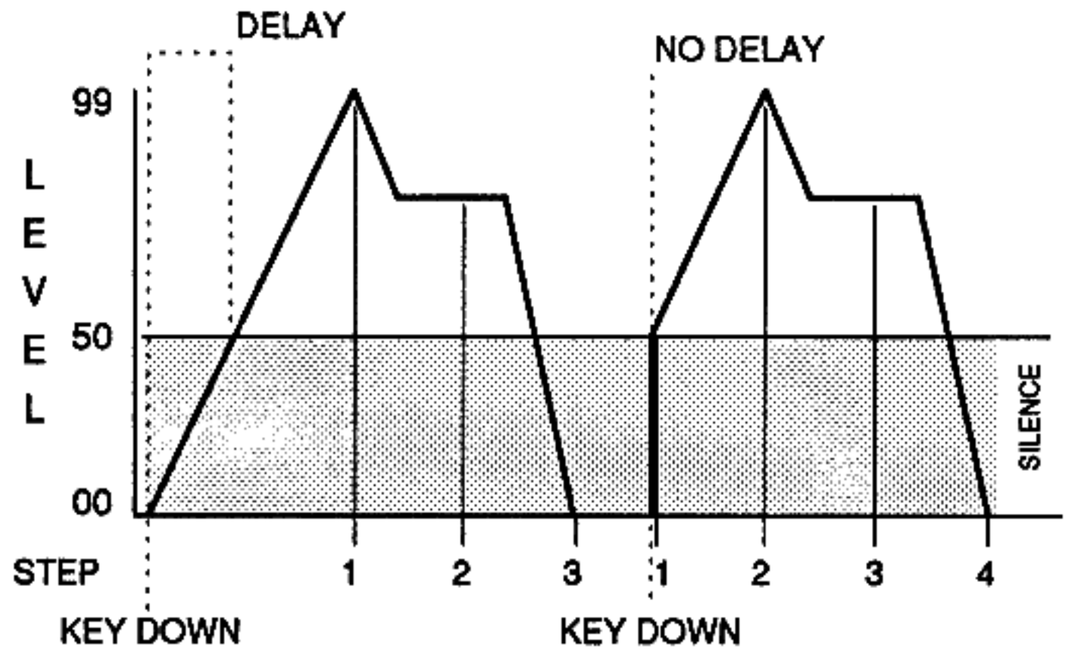
Guitar and Keyboard Control



Guitar and Sequencer Control

Optimizing envelopes for Improved Tracking

The same points we mentioned earlier in *Optimizing Envelopes* for PG-380 voices hold true for any VZ voices controlled by a MIDI guitar.

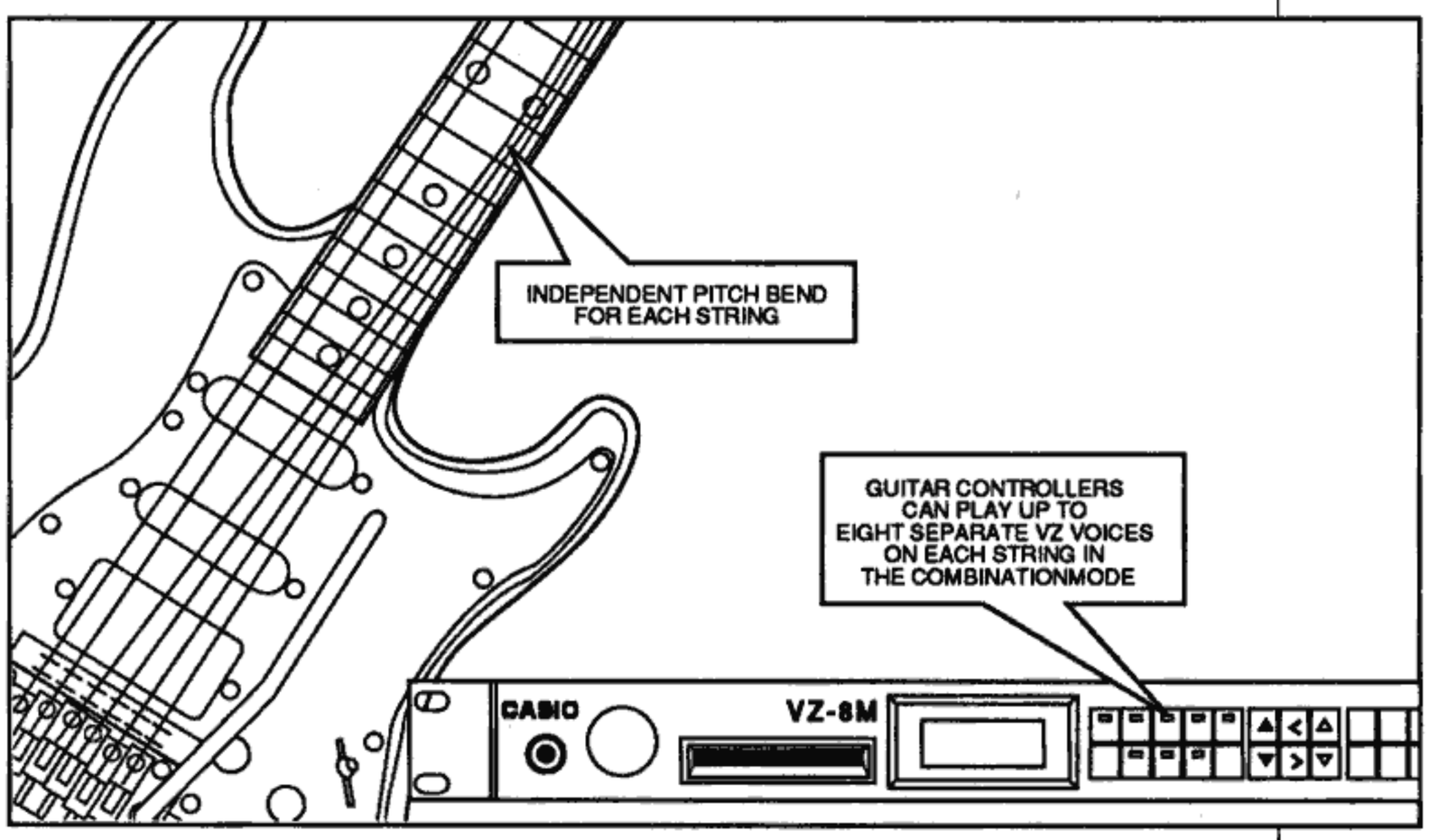


Re-tuning to Optimize Tracking

On most MIDI guitars, when you use a VZ as a tone module you'll notice that the lower strings track a bit slower than the upper strings. This delay is caused by the pitch-to-MIDI conversion, and is a function of the controller, not the tone module. You can minimize the delay by picking melodies and bass lines on the upper four strings. For bass sounds, you may want to transpose the controller or the sound down an octave. This way you can still play low notes without picking them on the low strings.

Using the VZ-8M Guitar Performance Mode

The VZ-8M's guitar performance mode allows you to play Normal and Combination mode sounds with mono mode guitar controllers. (A mono mode guitar controller transmits the note information for each string on a separate channel.) Some controllers, like the PG-380, let you select either the mono or poly mode. The main advantage of the mono mode is that the VZ can track pitch bending for each string, allowing you to slide chords, etc.



Follow these steps to use the guitar performance mode with your VZ-8M:

1. Make sure that the guitar controller is set to mono mode. On the PG-380 set the "poly/mono" micro switch on the back of the guitar to "mono".
2. When playing the VZ-8M in the normal mode, use the VALUE button to set the mode value to "G".

   When playing the VZ-8M in the combination mode, use the CURSOR button to select the mode value, and use the VALUE button to set the value to "G".

   Be sure the VZ-8M is set to the same MIDI channel as the base channel of the guitar controller.

Changing Operation Memories to the Guitar Performance Mode

The VZ-8M stores the performance mode as part of its operation memory data. You can change the performance mode of an internal or card operation memory with some simple editing:

1. Select the operation memory you want to change.
2. Transfer it to the combination work area by holding down the WRITE button and pushing the COMBINATION button.
3. Use the CURSOR button to select the mode value.
4. Use the VALUE button to set the value to "G".
5. Save the edited combination to an internal or RAM card operation memory.

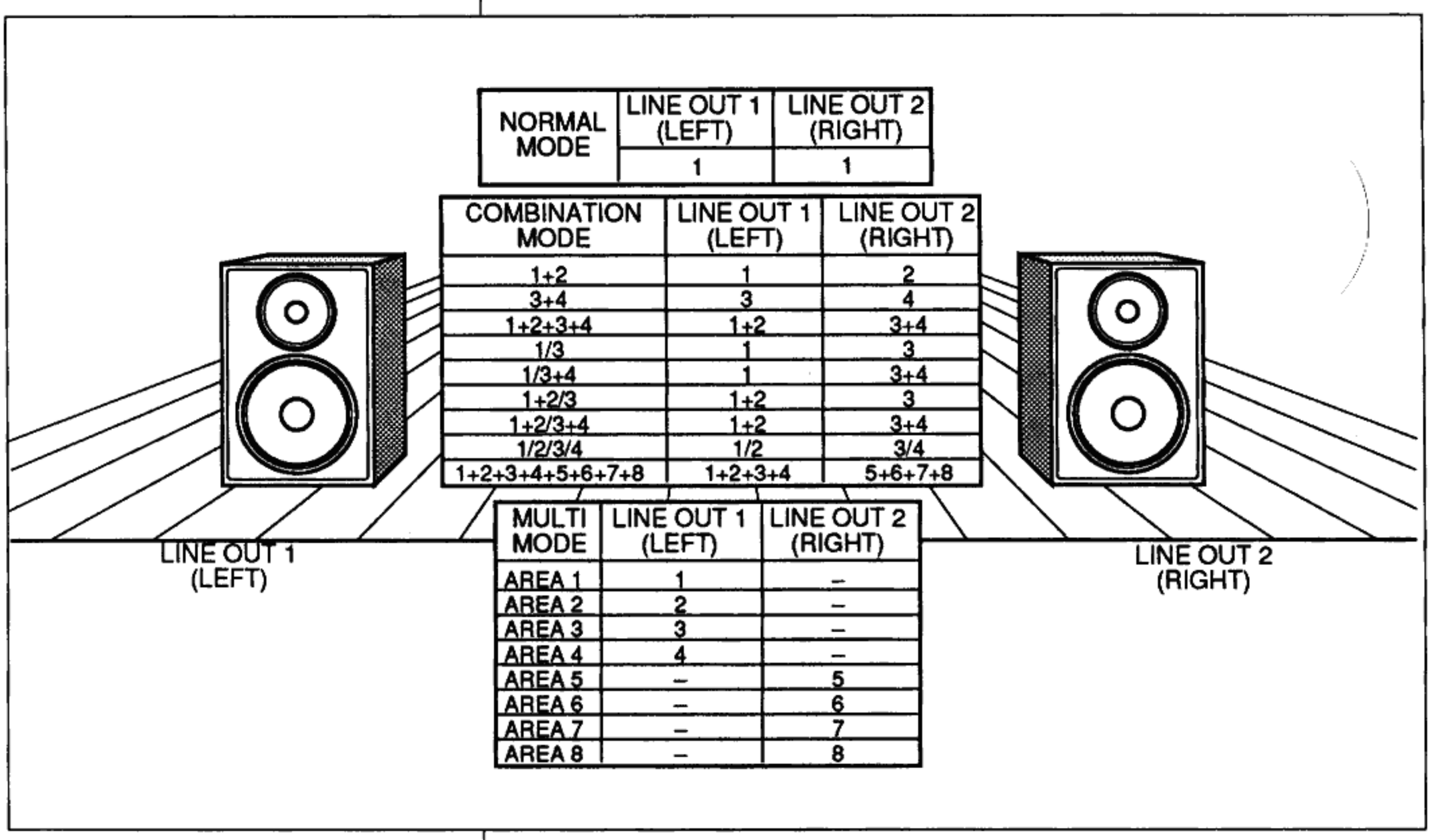
Getting Around on the VZ

Your VZ is a very powerful, full-featured MIDI instrument. It has multiple audio, MIDI and controller jacks, banks of internal voice and operations memories, and literally hundreds of parameters that you can edit. Furthermore, you can configure your VZ in one of three different "play modes" each with different voicing and MIDI features. In this section, we'll give you the big picture of how the features and functions of the VZ are laid out, how to get around its various menus, and how to connect the VZ to a variety of different MIDI systems.

Making Connections

Audio

The VZ synthesizers have two separate audio outputs. You can use these to create stereo effects, or to send different voices to different channels of a mixer. Audio routing is determined by the active play mode: Normal, Combination, or Multi. The following chart shows how voices are assigned in each mode.



NORMAL MODE	LINE OUT 1 (LEFT)	LINE OUT 2 (RIGHT)
	1	1

COMBINATION MODE	LINE OUT 1 (LEFT)	LINE OUT 2 (RIGHT)
1+2	1	2
3+4	3	4
1+2+3+4	1+2	3+4
1/3	1	3
1/3+4	1	3+4
1+2/3	1+2	3
1+2/3+4	1+2	3+4
1/2/3/4	1/2	3/4
1+2+3+4+5+6+7+8	1+2+3+4	5+6+7+8

MULTI MODE	LINE OUT 1 (LEFT)	LINE OUT 2 (RIGHT)
AREA 1	1	–
AREA 2	2	–
AREA 3	3	–
AREA 4	4	–
AREA 5	–	5
AREA 6	–	6
AREA 7	–	7
AREA 8	–	8

Stereo Voice Assignments

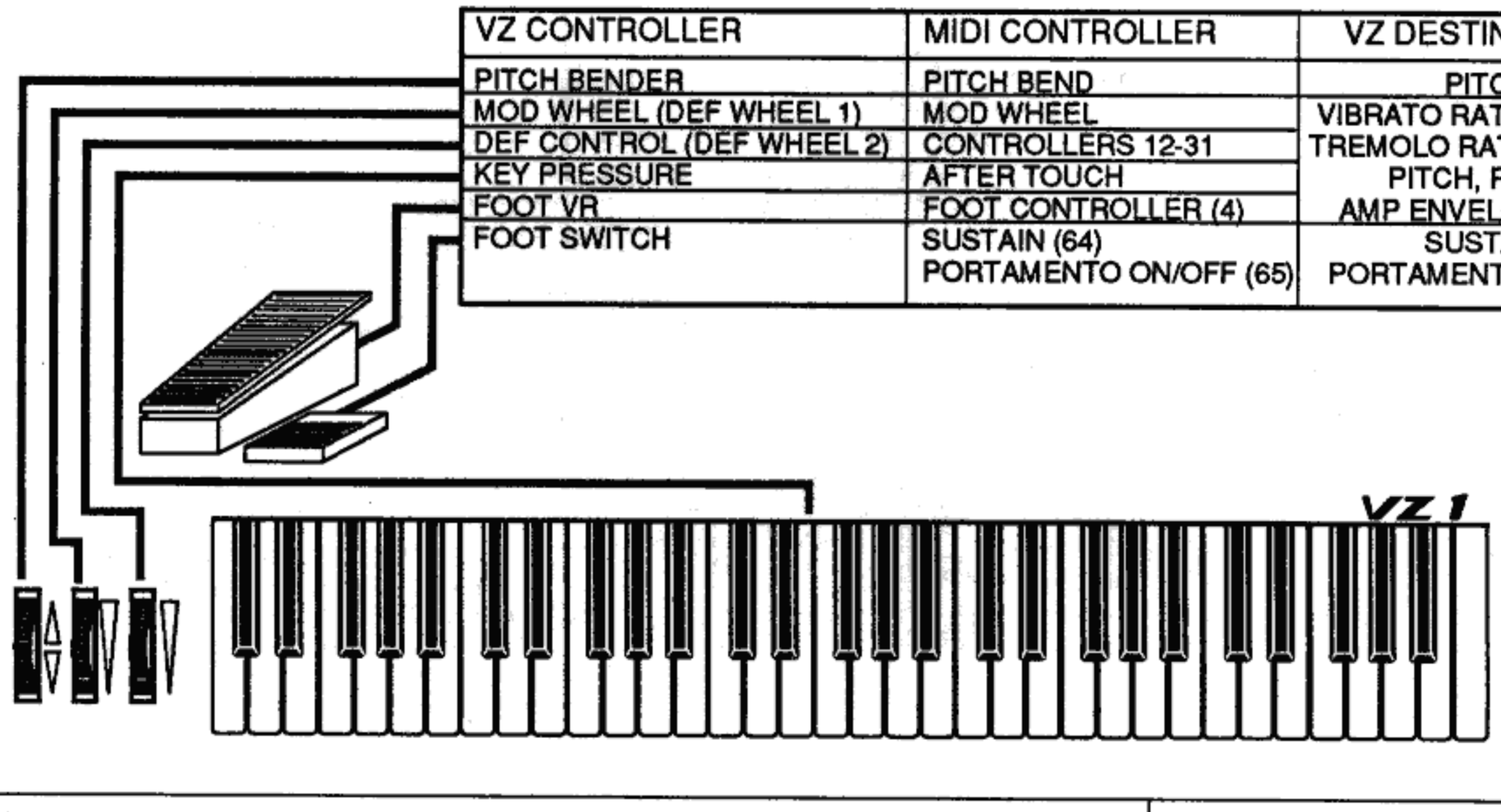
MIDI

The VZ synthesizers have versatile MIDI implementations which make them ideal for use within different types of MIDI systems. During the Normal or Combination modes of operation the VZs function in MIDI Mode 4 (Omni Off/Poly). (Note: this corresponds to the VZ-8M's Keyboard performance mode). Mode 4 is most useful when the VZ is played by a keyboard, "poly mode" guitar controller, wind controller, or a single channel of a MIDI sequencer. In this mode chords can be played, and each note of the chord will be assigned to the same Normal or Combination sound. The Guitar performance mode of the VZ-8 allows mono mode guitar controllers to play it in the Normal or Combination modes.

The VZ's Multi channel mode allows it to respond to multiple MIDI channels simultaneously. You can select up to eight different MIDI areas. Each area can be assigned to play any Normal VZ voice, on any one of the sixteen MIDI channels, with up to eight-note polyphony. This mode is most useful when controlling the VZ with several polyphonic tracks from a MIDI sequencer, or with a mono mode guitar controller. In the case of the VZ-1, the Multi channel mode allows you to play the VZ with its built-in keyboard, and an external MIDI controller (keyboard, guitar, wind, sequencer) at the same time, with each controller playing different sounds.

Controllers

VZ voices can be controlled in real-time with a variety of MIDI controllers, as well as with the built-in foot pedal, footswitch, and — in the case of the VZ-1 — with wheels. The following diagram shows different controllers and the possible destinations.



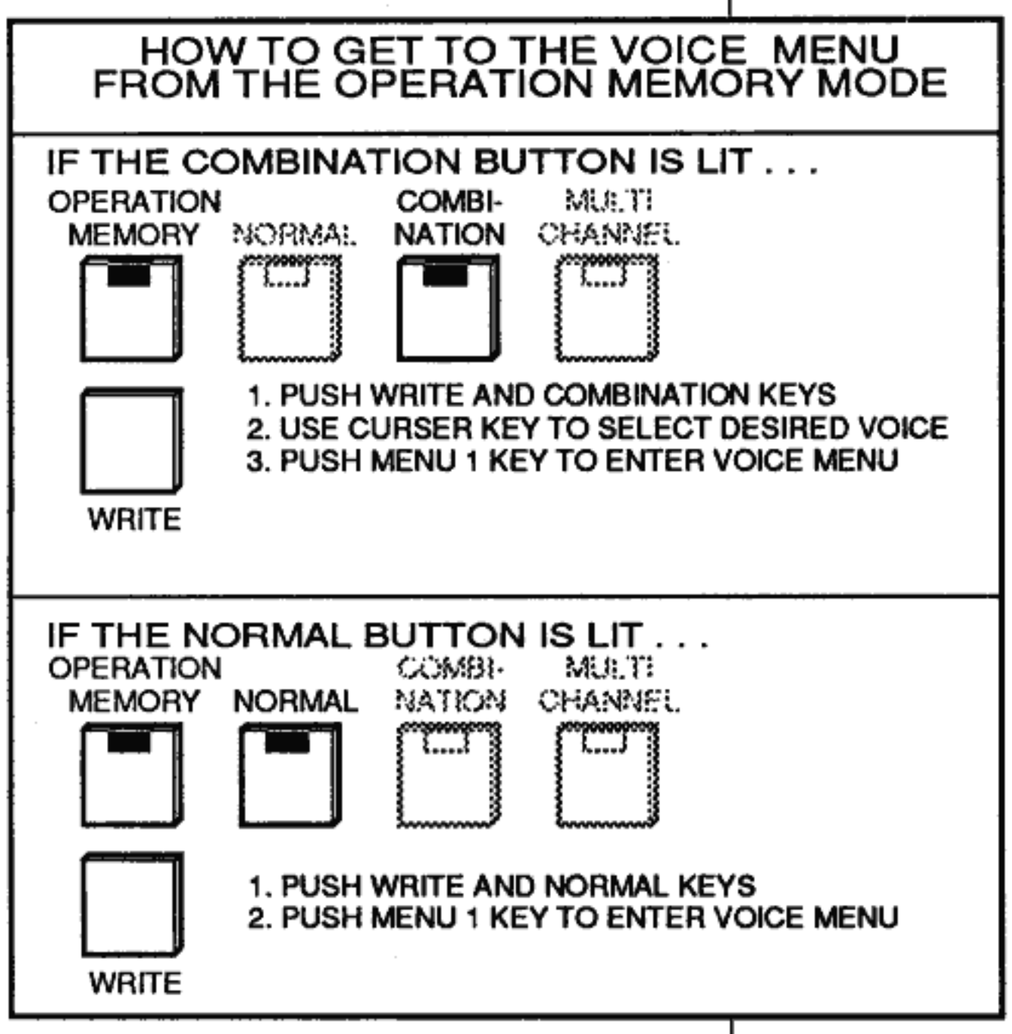
VZ CONTROLLER	MIDI CONTROLLER	VZ DESTINATIONS
PITCH BENDER	PITCH BEND	PITCH
MOD WHEEL (DEF WHEEL 1)	MOD WHEEL	VIBRATO RATE & DEPTH
DEF CONTROL (DEF WHEEL 2)	CONTROLLERS 12-31	TREMOLO RATE & DEPTH
KEY PRESSURE	AFTER TOUCH	PITCH, P-TIME
FOOT VR	FOOT CONTROLLER (4)	AMP ENVELOPE BIAS
FOOT SWITCH	SUSTAIN (64)	SUSTAIN
	PORTAMENTO ON/OFF (65)	PORTAMENTO ON/OFF

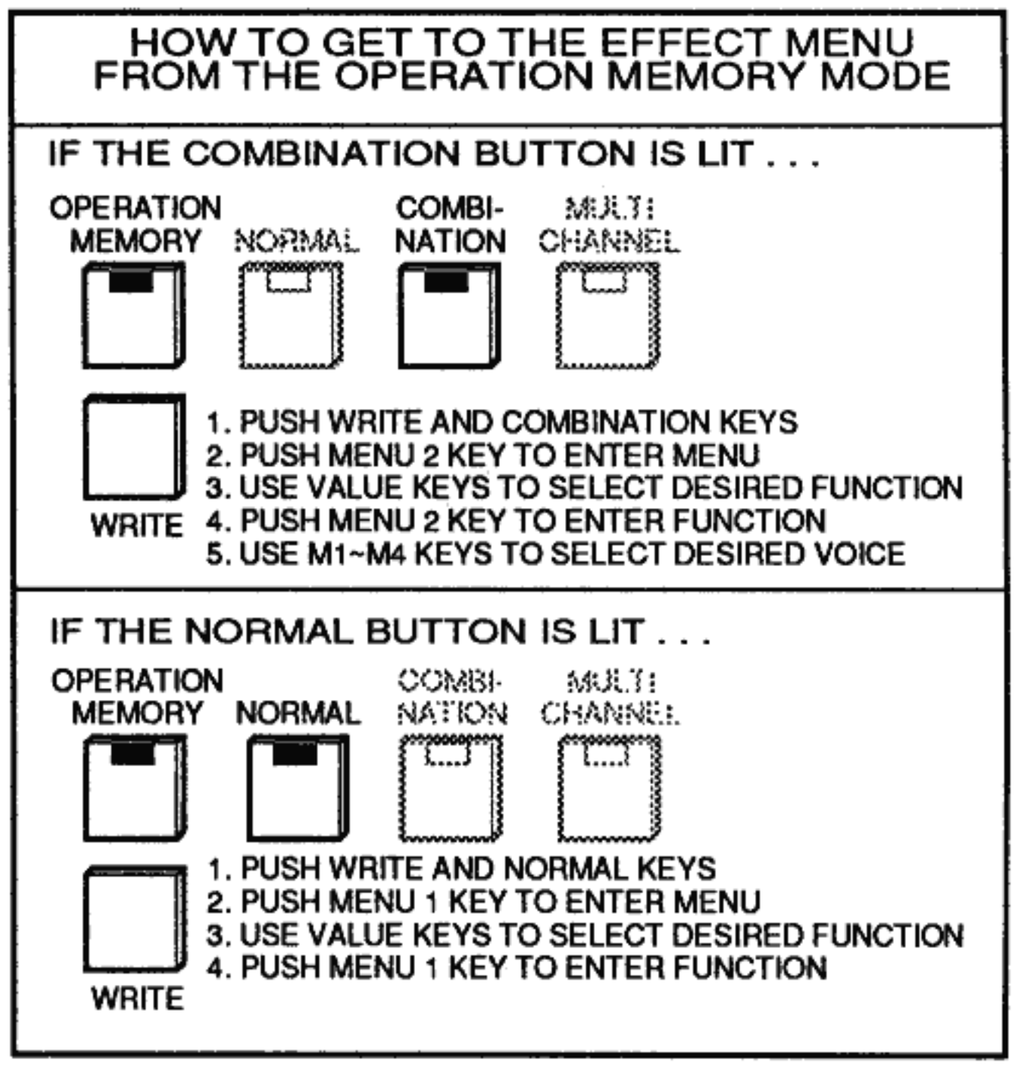
Controller Assignments

Menu Organization

When you play a VZ instrument, the sound and effects you hear are created by a combination of three independent sets of parameters. These sets of parameters correspond to the three VZ menus: voice parameter, effect, and total control. Voice parameters are the settings for the eight iPD modules that make up a single VZ voice. Effect parameters are the settings of controllers (like after touch, wheels and the foot pedal) and effects (like velocity split and delay trigger). Total control parameters are the settings of "system" functions (like memory protect and master tune). The following groups of illustrations show the menu organization for the VZ-1/VZ-10M and the VZ-8M.

Getting to the Voice and Effect Menus on the VZ-1 or VZ-10M





VZ-1/VZ-10M Menu 1: Voice Parameters

FUNCTION	PARAMETERS
LINE	INT LINE
	EXT PHASE
WAVEFORM	FORM
DETUNE	PITCH FIX
	RANGE
	HARMONIC
	TUNE
PITCH ENV	R1~R8
	L1~L8
	SS
	ED
P ENV DEPTH	DEPTH
	RANGE
P KF LEVEL	KEY 1~KEY 6
	L1~L6
P VEL LEVEL	SENS
	CURVE
VIBRATO	WAVE
	DEPTH
	RATE
	DELAY
	MULTI
OCTAVE	OCTAVE
AMP ENV	R1~R8
	L1~L8
	SS
	ED
ENV DEPTH	ENV DEPTH
KF LEVEL	KEY 1~KEY 6
	L1~L6
VEL LEVEL	SENS
	CURVE
TREMOLO	WAVE
	DEPTH
	RATE
	DELAY
	MULTI
AMP SENS	SENS
TOTAL LEVEL	LEVEL
KF RATE	KEY 1~KEY 6
	R1~R6
VEL RATE SENS	SENS
P VEL RATE	ENA
A VEL RATE	ENA
VOICE NAME	NAME

VZ-1/VZ-10M Menu 2: Effect Parameters

FUNCTION	PARAMETERS
OPERATION NAME	NAME
PORTAMENTO/SOLO	PORTAMENTO
	PORTM TIME
	PORTM MODE
	SOLO
	POLY/MONO
PITCH BEND	RANGE
	RELEASE
AFTER TOUCH	SENSITIVITY
	VIB DEPTH
	VIB RATE
	PITCH
	PORTM TIME
	TREM DEPTH
	TREM RATE
	A ENV BIAS
DEF WHEEL 1	SENSITIVITY
	VIB DEPTH
	VIB RATE
	PITCH
	PORTM TIME
	TREM DEPTH
	TREM RATE
	A ENV BIAS
DEF WHEEL 2	SENSITIVITY
	VIB DEPTH
	VIB RATE
	PITCH
	PORTM TIME
	TREM DEPTH
	TREM RATE
	A ENV BIAS
FOOT VR	SENSITIVITY
	VIB DEPTH
	VIB RATE
	PITCH
	PORTM TIME
	TREM DEPTH
	TREM RATE
	A ENV BIAS
LEVEL	FIX
	CONTROL
	AUTO
PITCH	POLARITY
	OCTAVE
	NOTE
	FINE
SPLIT POINT	POINT
SUSTAIN PEDAL	SUSTAIN
VEL SPLIT	RANGE
VEL INVERSE	INVERSE
POS CROSSFADE	X-FADE
	POS
DELAY TRIGGER	X-FADE
	POS
VIBRATO INVERSE	INVERSE
TREMOLO INVERSE	INVERSE
COMBI COPY	COPY
PITCH	POLARITY
	OCTAVE
	NOTE
	FINE

VZ-1/VZ-10M Menu 3: Total Control

FUNCTION	PARAMETERS
TUNE/TRANSPOSE	TUNE
	TRANSPOSE
MEMORY PROTECT	INTERNAL
	CARD
SAVE/LOAD	SAVE/LOAD
	CARD/MIDI
	DATA
MIDI CHANNEL	CHANNEL
	TOTAL
MIDI DATA	PROGRAM
	EXCLUSIVE
	DEF CONTROL
	VOLUME
	OVERFLOW
PITCH BEND	TOTAL BEND
	RANGE
	RELEASE
CARD FORMAT	EXECUTE
PRESET CALL	NUMBER

Getting to the Voice and Effect Menus on the VZ-8M

HOW TO GET TO THE VOICE MENU FROM THE OPERATION MEMORY MODE

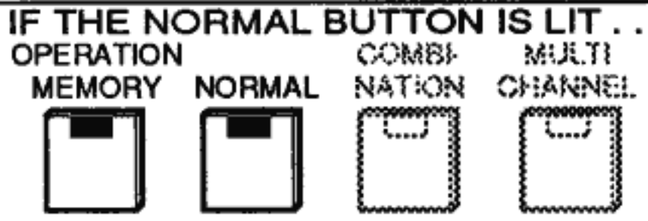
IF THE COMBINATION BUTTON IS LIT . . .

1. PUSH WRITE AND COMBINATION KEYS
2. USE CURSER KEY TO DISPLAY VOICE NUMBER
3. PUSH NORMAL KEY
4. RECALL VOICE NUMBER
5. PUSH EDIT KEY
6. PUSH PAGE-DOWN KEY TO ENTER VOICE MENU

IF THE MULTI-CHANNEL BUTTON IS LIT . . .

1. PUSH WRITE AND MULTI-CHANNEL KEYS
2. USE CURSER KEY TO DISPLAY VOICE NUMBER
3. PUSH NORMAL KEY
4. RECALL VOICE NUMBER
5. PUSH EDIT KEY
6. PUSH PAGE-DOWN KEY TO ENTER VOICE MENU

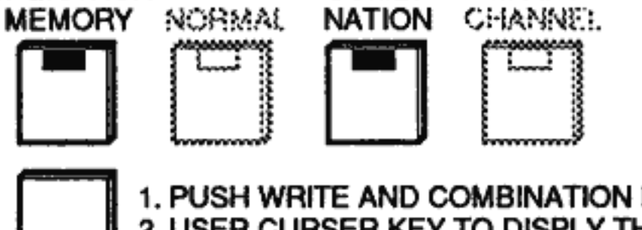
IF THE NORMAL BUTTON IS LIT . . .



1. PUSH WRITE AND NORMAL KEYS
2. PUSH EDIT KEY
3. PUSH PAGE-DOWN KEY TO ENTER VOICE MENU

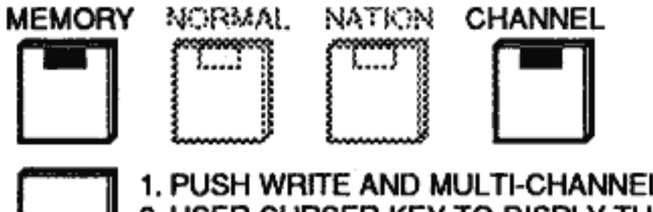
HOW TO GET TO THE EFFECT MENU FROM THE OPERATION MEMORY MODE

IF THE COMBINATION BUTTON IS LIT . . .



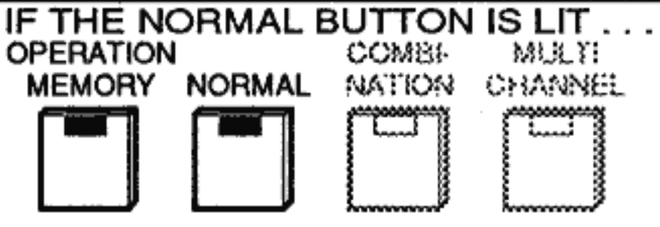
1. PUSH WRITE AND COMBINATION KEYS
2. USER CURSER KEY TO DISPLY THE DESIRED VOICE
3. PUSH EDIT KEY TO ENTER MENU

IF THE MULTI-CHANNEL BUTTON IS LIT . . .



1. PUSH WRITE AND MULTI-CHANNEL KEYS
2. USER CURSER KEY TO DISPLY THE DESIRED VOICE
3. PUSH EDIT KEY TO ENTER MENU

IF THE NORMAL BUTTON IS LIT . . .



1. PUSH WRITE AND NORMAL KEYS
2. PUSH EDIT KEY TO ENTER MENU

VZ-8M Voice Parameter Menu

FUNCTION	PARAMETERS
LINE	INT LINE
	EXT PHASE
WAVEFORM	FORM
DETUNE	PITCH FIX
	RANGE
	HARMONIC
	TUNE
PITCH ENV	R1~R8
	L1~L8
	SS
	ED
P ENV DEPTH	DEPTH
	RANGE
P KF LEVEL	KEY 1~KEY 6
	L1~L6
P VEL LEVEL	SENS
	CURVE
VIBRATO	WAVE
	DEPTH
	RATE
	DELAY
	MULTI
OCTAVE	OCTAVE
AMP ENV	R1~R8
	L1~L8
	SS
	ED
ENV DEPTH	ENV DEPTH
KF LEVEL	KEY 1~KEY 6
	L1~L6
VEL LEVEL	SENS
	CURVE
TREMOLO	WAVE
	DEPTH
	RATE
	DELAY
	MULTI
AMP SENS	SENS
TOTAL LEVEL	LEVEL
KF RATE	KEY 1~KEY 6
	R1~R6
VEL RATE SENS	SENS
P VEL RATE	ENA
A VEL RATE	ENA
VOICE NAME	NAME
INIT VOICE	EXECUTE

VZ-8M Effect Parameter Menu

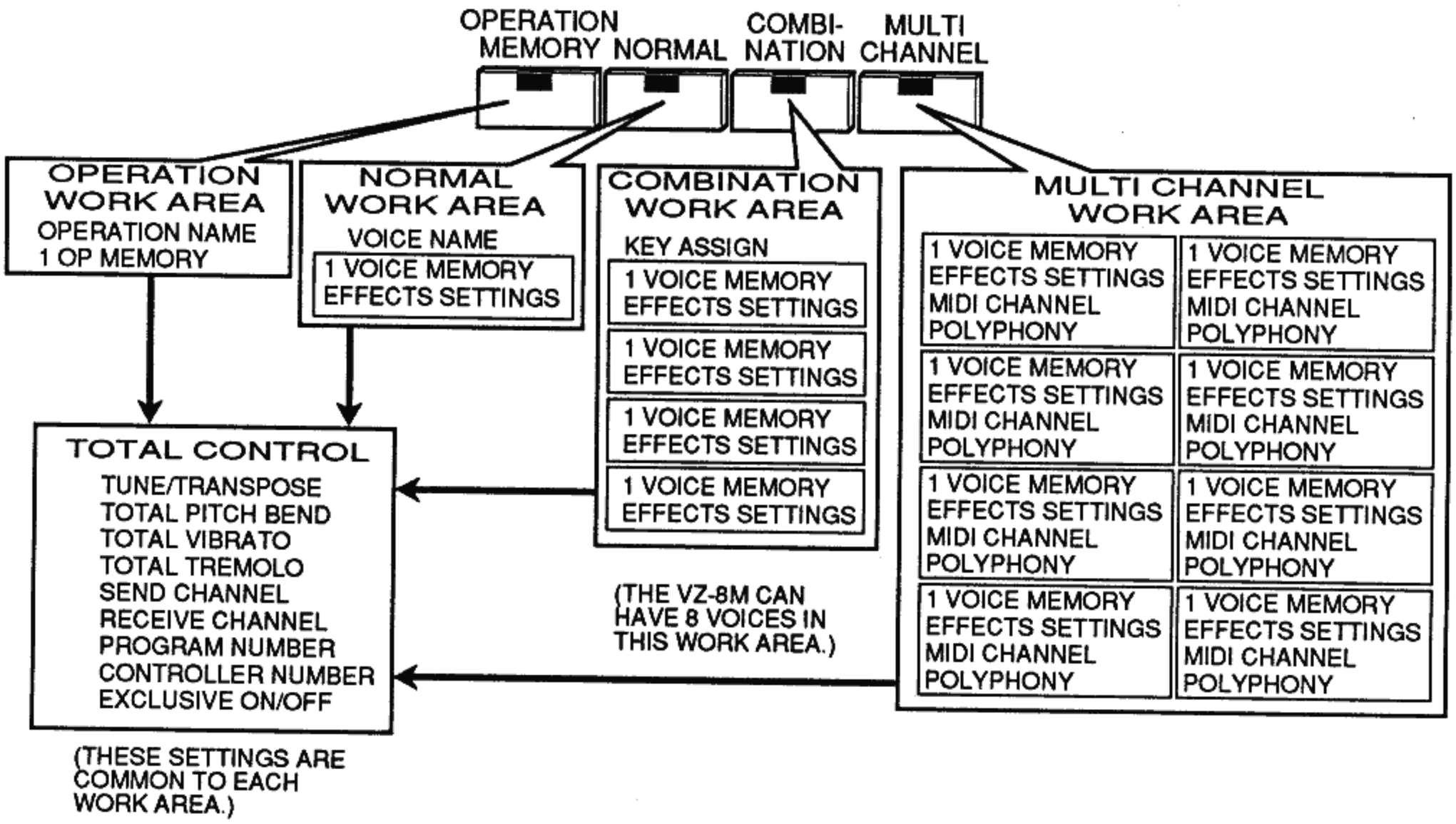
FUNCTION	PARAMETERS
MIDI CHANNEL	CHANNEL
PORTAMENTO/SOLO	PORTAMENTO
	PORTM TIME
	PORTM MODE
	SOLO
	POLY/MONO
PITCH BEND	RANGE
	RELEASE
AFTER TOUCH	SENSITIVITY
	VIB DEPTH
	VIB RATE
	PITCH
	PORTM TIME
	TREM DEPTH
	TREM RATE
	A ENV BIAS
MOD WHEEL	SENSITIVITY
	VIB DEPTH
	VIB RATE
	PITCH
	PORTM TIME
	TREM DEPTH
	TREM RATE
	A ENV BIAS
DEF CONTROL	SENSITIVITY
	VIB DEPTH
	VIB RATE
	PITCH
	PORTM TIME
	TREM DEPTH
	TREM RATE
	A ENV BIAS
FOOT VR	SENSITIVITY
	VIB DEPTH
	VIB RATE
	PITCH
	PORTM TIME
	TREM DEPTH
	TREM RATE
	A ENV BIAS
FOOT SW	SUSTAIN
	SOSTENUTO
VEL TABLE SELECT.	TABLE NO.
PAN	FIX
	CONTROL
	AUTO
LEVEL	FIX
	CONTROL
	AUTO
PITCH	POLARITY
	OCTAVE
	NOTE
	FINE
SPLIT POINT	POINT
VEL SPLIT	RANGE
VEL INVERSE	INVERSE
POS CROSSFADE	X-FADE
	POS
DELAY TRIGGER	X-FADE
	POS
TOTAL VIBRATO	TOTAL
VIBRATO INVERSE	INVERSE
TOTAL TREMOLO	TOTAL
TREMOLO INVERSE	INVERSE
COMBI COPY	COPY
OPERATION NAME	NAME
OPERATION TUNE	POLARITY
	OCTAVE
	NOTE
	FINE

VZ-8M Total Control Menu

FUNCTION	PARAMETERS
MASTER TUNE	TUNE
TRANSPOSE	TRANSPOSE
MEMORY PROTECT	INTERNAL
	CARD
SAVE/LOAD	SAVE/LOAD
	CARD/MIDI
	DATA
MIDI CHANNEL	CHANNEL
	TOTAL
MIDI DATA	PROGRAM
	EXCLUSIVE
	DEF CONTROL
	VOLUME
	OVERFLOW
CARD FORMAT	EXECUTE

Play Modes

VZ synthesizers have four play modes: Normal, Combination, Multi channel, and Operation. Each play mode has an independent "work area" in the VZ's memory that becomes active whenever a play mode is selected. The settings of the active play mode can be edited from the front panel. The latest settings of each work area are held in memory when you switch to a different mode or turn off the VZ.



Normal Mode

The Normal mode is used to play, edit and create VZ voices. From this mode, you can select and play any single voice from the internal or card memories. You can edit any of the items from the voice parameter or effects menus, change the current voice or its parameters without affecting the active effects settings, or change effects settings without affecting the current voice.

There are two ways to save the contents of the Normal mode work area. You can save only the voice parameters to an internal or card voice memory, or you can save both the voice parameters and effect settings to an internal or card operation memory.

Combination Mode

The Combination mode is used to configure and play multiple voice "patches." From this mode you can select any of the key-assign configurations. Each assign mode allows up to four different voices to be played in a variety of split or layered combinations. (On the VZ-M, there is also an eight-voice configuration.) After selecting a key-assign mode, you can assign internal or card memory voice locations to each patch in the configuration (Internal A-1, for example). You can also edit the related effect menu items for each patch in the configuration. Changes made to voice selections and effect settings are independent of each other.

The VZ-8M can't edit voice parameters directly from the Combination mode. You must enter the Normal mode and select the voice you want to edit. Make the desired changes and re-save the voice to the same internal or card location. Return to the Combination mode to hear the edited voice in the Combination patch.

The contents of the Combination mode work area can be saved to an internal or card operation memory. This includes the current key assign configuration, the voice location for each patch and the effects settings for each patch.

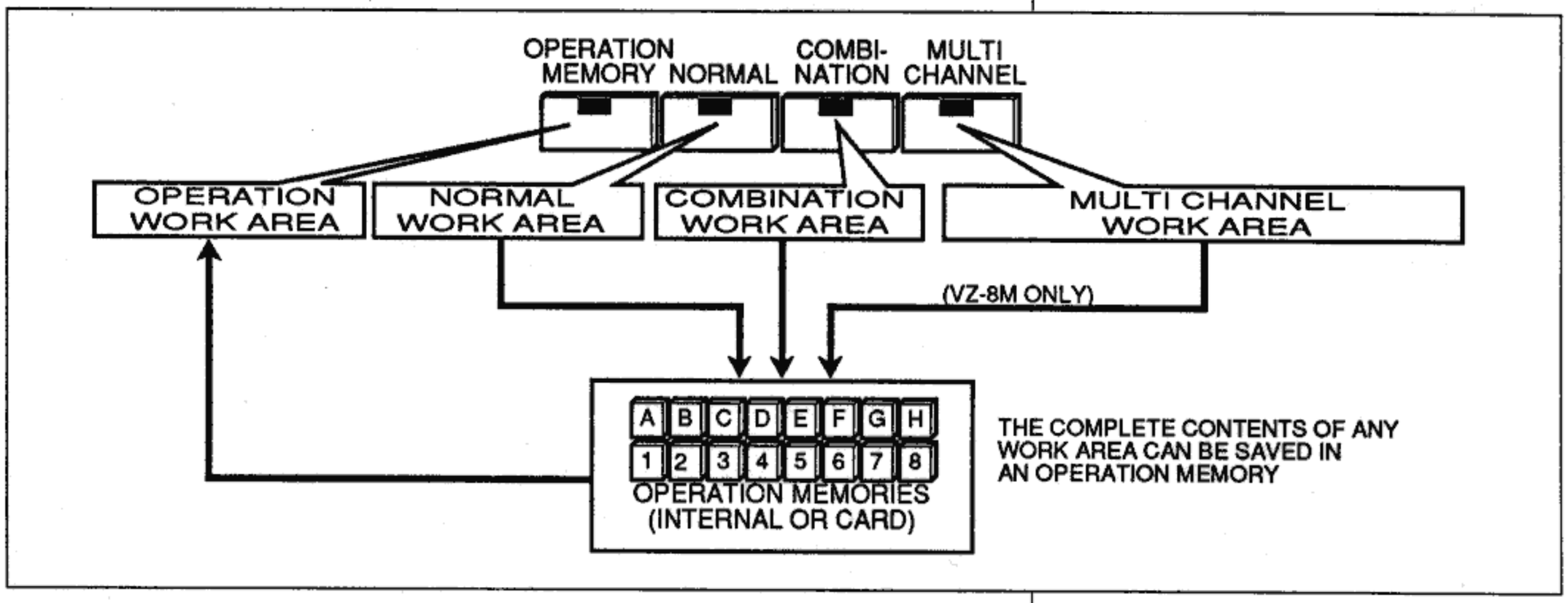
Multi Channel Mode

The Multi channel mode is used to configure and play the VZ from multiple MIDI channels. Up to eight "MIDI areas" can be set up. For each area you can assign a different internal or card voice location, MIDI channel and polyphony value. You can also edit the related effect menu items for each area. Changes made to voice selections and effect settings are independent of each other.

The VZ-8M can save the Multi channel work area to an internal or card operation memory. The VZ-1 and VZ-10M cannot save the contents of the Multi channel work area.

Operation Memory Mode

The Operation memory play mode is used to play combined voice and effect settings saved previously from a Normal, Combination, or Multi channel (VZ-8M only) work area. The voice parameters and effect settings in an Operation memory can not be edited in the Operation mode. They must first be transferred to the work area for the mode in which they were saved. This is easy to do.



If you only want to edit voice parameters, simply enter the Normal mode and make the desired changes. When you're done, re-save the voice to the same internal or card memory location.

If you want to edit the effects settings of an Operation, follow these steps:

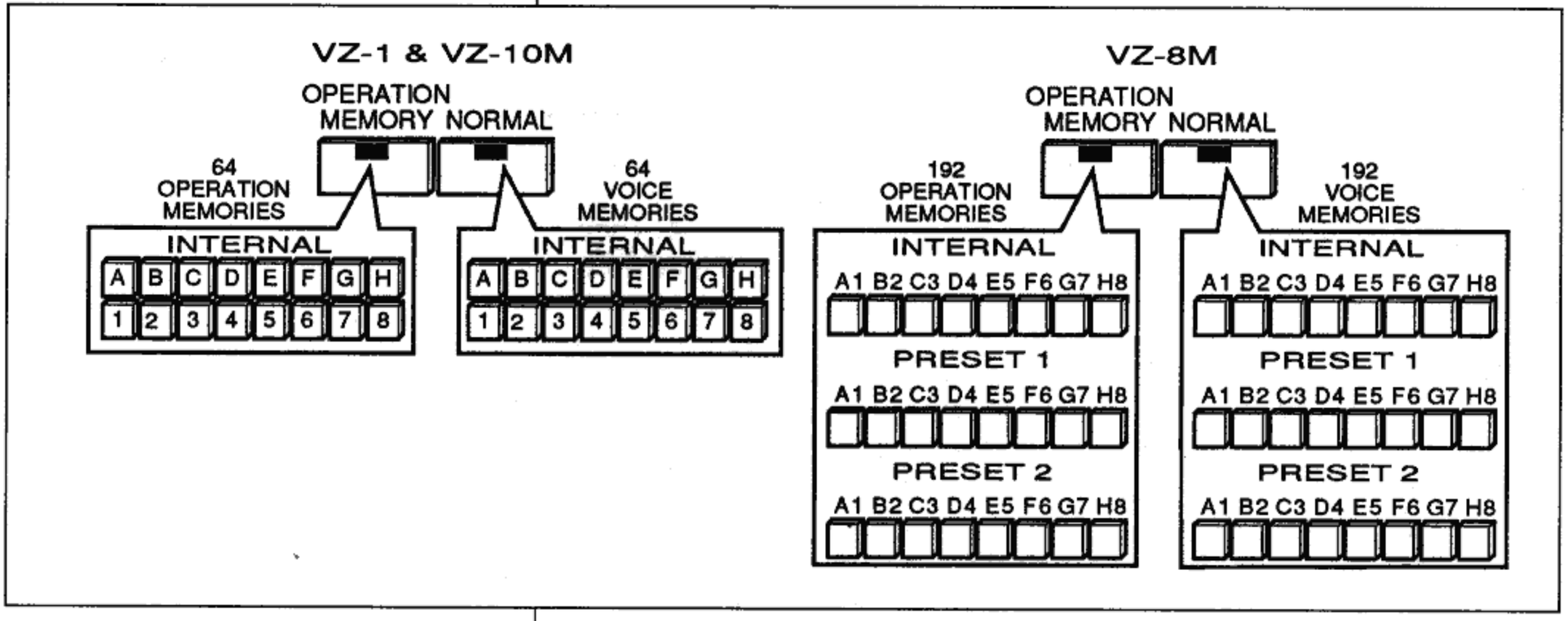
1. While in the Operation memory mode, select the memory you want to edit.
2. Hold down the WRITE button. The appropriate mode button (Normal, Combination, or Multi) will light.
3. While still holding the WRITE button, press the lit mode button.
4. Edit the desired items and, if you wish, save your changes into an internal or card operation memory.

Memory Organization

Internal Memories

The VZ-1 and VZ-10M have 64 internal voice memories and 64 internal operation memories. These memories are filled with presets when the VZ arrives from the factory. You can replace them with voices and operation memories of your own by editing them or loading voices from cards or other VZs. You can re-install the factory presets by performing the following initialization procedure:

1. Turn off the VZ.
2. Hold down the WRITE button and turn on the VZ.
3. When you see the "YES?" prompt press the YES button.

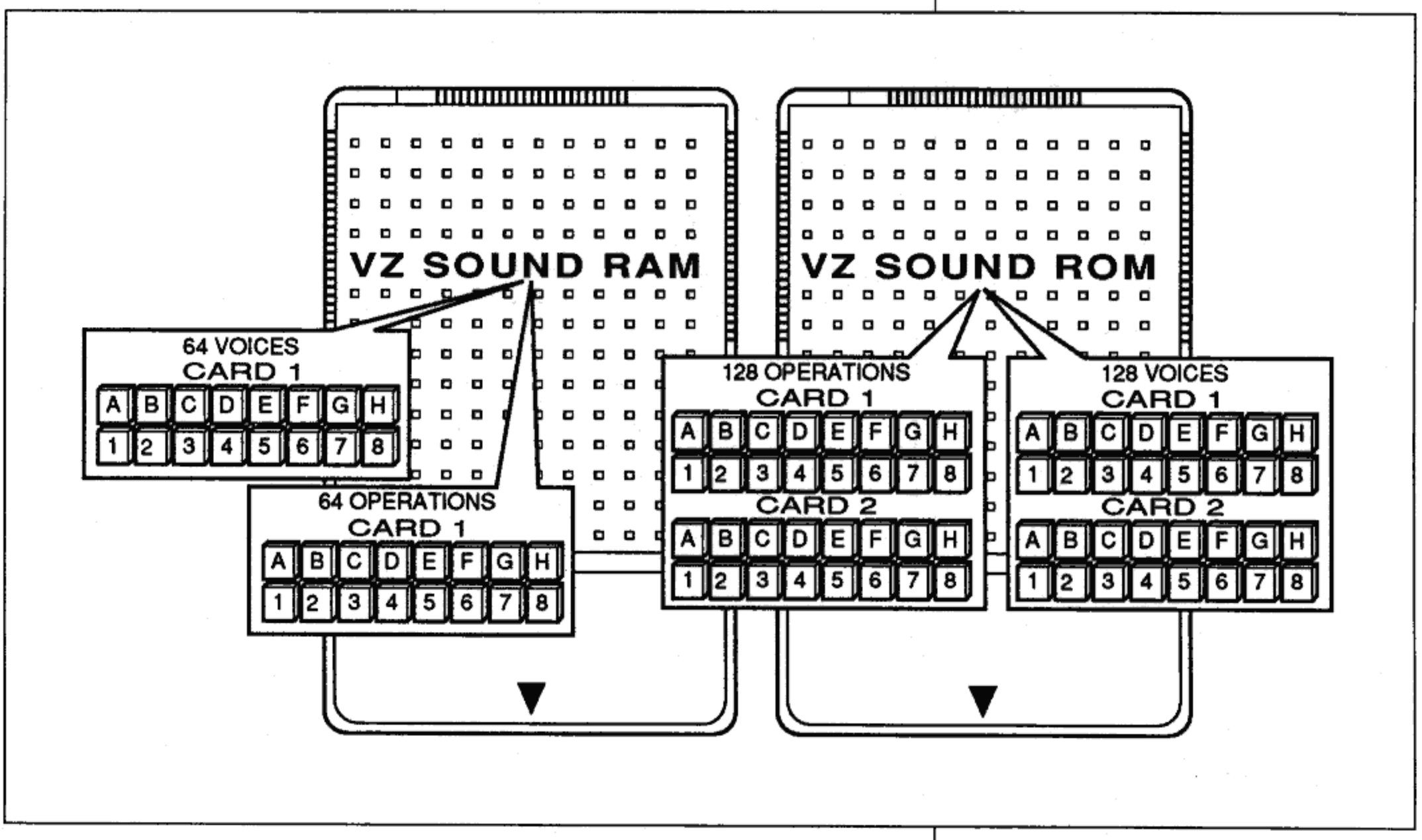


The VZ-8M has internal and preset memories. The internal memories can be changed or replaced. The presets are "read only" memories, so the contents of a preset memory location can't be changed. (To create an edited version of a preset, select and edit it in the normal manner, then save it to an internal or RAM card memory.) There are 64 internal voice memories and 128 preset voice memories, as well as 64 internal operation memories and 128 preset operation memories in the VZ-8M.

Card Memories

VZ synthesizers can access voices and operation memories from RAM and ROM cards. The internal VZ synthesizer in the PG-380 can access voice memories from RAM and ROM cards. RAM cards hold 64 voice and 64 operation memories. The voice and operation memories of a RAM card may be replaced using the different "save" options. ROM cards hold 128 voice and 128 operation memories. Their contents cannot be changed.

You can purchase additional ROM and RAM cards already filled with voice and operation memories directly from CASIO, or from third party sound developers. You can also get blank RAM cards from CASIO and fill them with voices and operation memories of your own creation.



Part 2:

Exploring iPD Synthesis

Part 2: Exploring iPD Synthesis

In this section of the book, we'll explore the unique technology employed by VZ instruments, iPD synthesis. iPD stands for *interactive phase distortion.* Phase distortion (PD) is a method of producing sounds by modulating (distorting) a DCO (oscillator) waveform in real-time. (PD technology is used in Casio's popular line of CZ instruments.) Unlike PD synthesis, iPD utilizes multiple DCOs. These DCOs are *interactive*. The output of one DCO can be used to modulate the phase of another DCO which can, in turn, modulate the phase of still another DCO. In fact, as many as eight DCOs can be linked together in this manner. The result is a very flexible new form of synthesis that can create a wide variety of sounds and effects. Rather than launch into a long theoretical discussion of iPD synthesis, we're going to give you a series of hands-on experiments. These experiments are designed to let you hear iPD synthesis in action. Once you've gone through each of the experiments with your VZ, you'll have a solid, *practical* understanding of what the main voice parameters do and how they can affect the overall sound of a voice. The examples in the next section will show you how the voice and effect parameters of the VZ can be used together to create many kinds of sounds and effects.

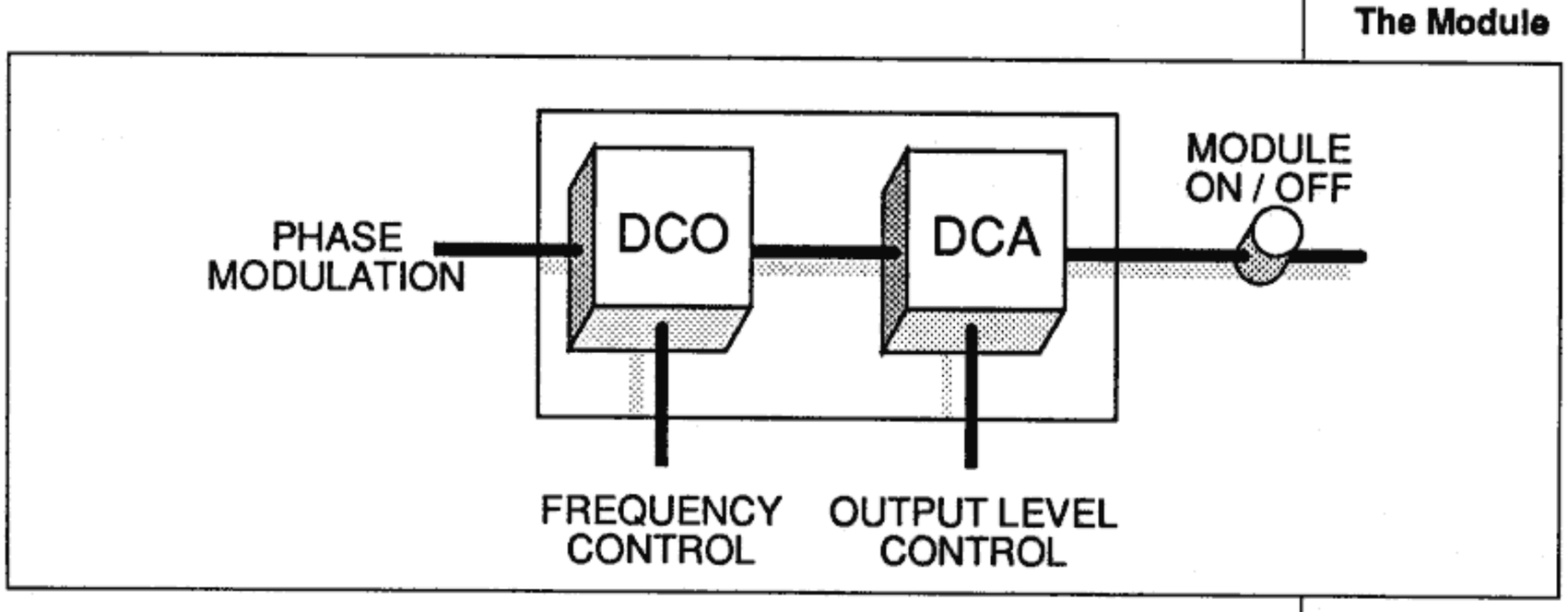
If you'd like to learn more about synthesis and sound, be sure to check out our book, **The Secrets of Analog and Digital Synthesis.**

Experimenting With Modules

The *module* is the basic element of an iPD sound. A single voice is made up of eight modules. Each individual module can be a sound source, or it can interact with other modules to produce timbre (tone color) changes in a sound. Although it is difficult to explain these interactions in words, they're easy to understand when you hear the timbre changes they produce. Later on in this section, we'll show you how to set up and listen to interactions between two or more modules. Right now, however, we'll begin our exploration of iPD synthesis by looking at and listening to a single module.

A module is made up of two components, a DCO, and DCA. When used as a sound source, DCO settings will determine the pitch and timbre (tone color) of the sound coming from the module; DCA settings will determine the loudness. When used to modify the sounds produced by other modules, DCO settings will determine the overall tone color of the sound, and DCA settings will determine the overall brightness of the sound.

The Module

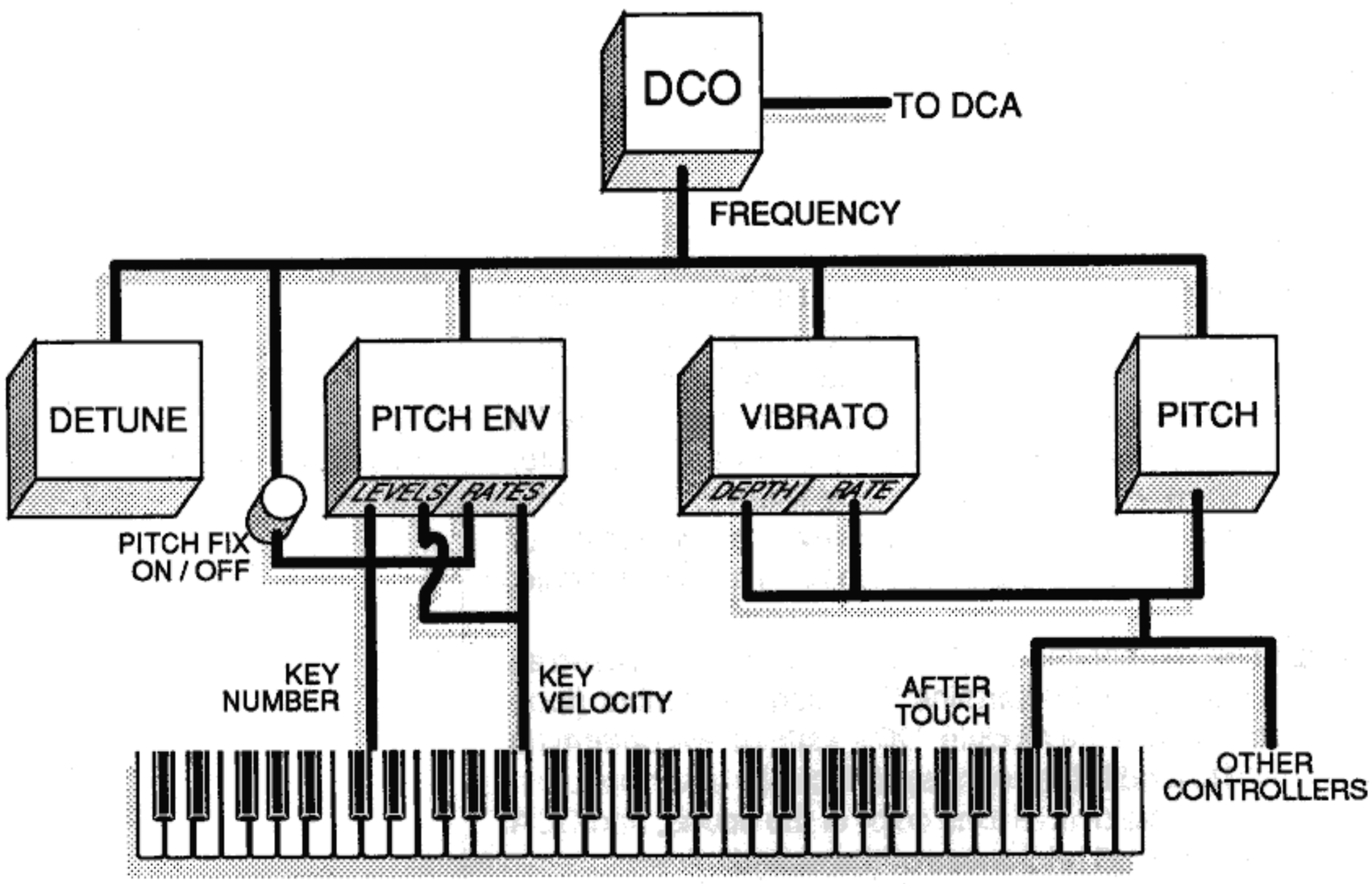


DCO Parameters

Here's a summary of the voice parameters associated with the DCO:

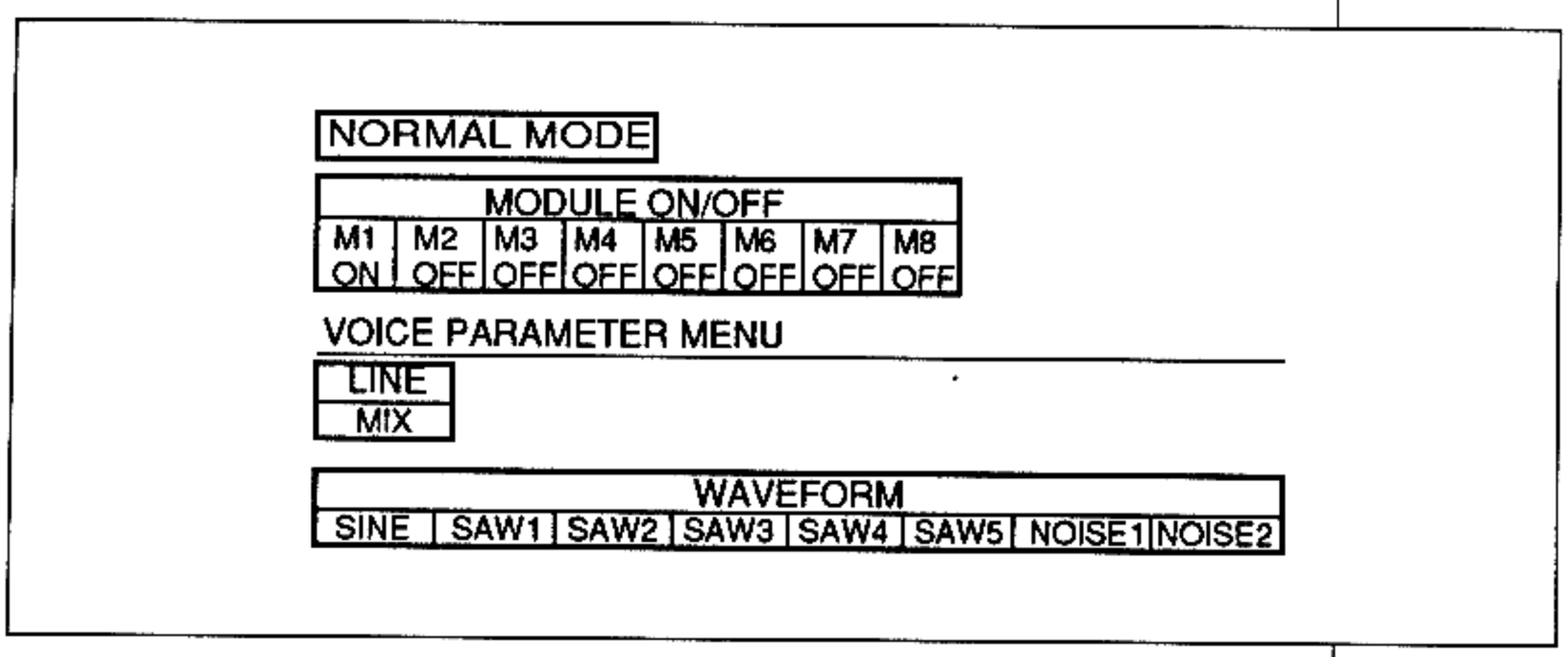
- WAVEFORM: Selects one of eight different waveforms for each module. Each waveform has a different tone color.
- DETUNE : Sets the basic tuning of each module.
- PITCH ENV: Creates a pitch envelope that will affect all modules.
- P ENV DEPTH: Sets the overall depth of the pitch envelope.
- P KF LEVEL: Varies the pitch envelope depth acording to which keys are played.
- P VEL LEVEL : Varies the pitch envelope depth according to the velocity used to play a note.
- KF RATE: Varies pitch envelope rates according to which keys are played.
- VEL RATE: Varies pitch envelope rates according to the velocity used to play a note.
- VIBRATO: Creates pitch modulation effects.
- OCTAVE: Transposes all modules up or down one or two octaves.

DCO Parameters



The following experiments will guide you through the different DCO parameters on the VZ.

Waveform



1. Start with "Init Voice".
2. Enter the WAVEFORM parameter.
3. The display should read "SINE". Play middle C and listen to this waveform.
4. Use the VALUE key to select the next waveform, "SAW 1". Play middle C and listen to this waveform.
5. Repeat the previous step until you've listened to all eight waveforms.

As you can hear, each waveform has its own distinctive timbre. Keep in mind that, when a module is used for phase modulation, each waveform will also have a distinct effect on the phase-modulated sound.

Pitch Envelope

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

PITCH ENV								
STEP	1	2	3	4	5	6	7	8
RATE	99	0	99	0	99	0	99	0
LEVEL	4	5	8	9	12	13	16	17
SS/ED	–	–	–	–	–	–	–	ED

P ENV DEPTH	
DEPTH	NARROW
RANGE	63

1. Start with "Init Voice".
2. Enter the P ENV DEPTH parameter.
3. Set the depth and range values as shown.
4. Enter the PITCH ENV parameter.
5. Set the rates and levels as shown.
6. Play middle C and hold it. You will hear an ascending four-note melody. Each note is about one semitone higher than the one before it.
7. Enter the P ENV DEPTH parameter and change the range to "WIDE".
8. Play middle C and hold it. Again, you will hear a four-note melody, but this time each note is about four semitones higher than the one before it.

The pitch envelope was used to "play" both melodies. The levels determined the pitches and the rates determined the time between notes. The range parameter of P ENV DEPTH determines the amount of pitch change. When it is set to "WIDE", each level-unit equals one semitone. When it is set to "NARROW", each level-unit equals one-quarter of a semitone.

The overall amount of the pitch envelope effect is set with the depth parameter. However, it is possible to control the pitch envelope depth value with the P KF LEVEL and P VEL LEVEL functions.

Pitch Key Follow Level

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

PITCH ENV								
STEP	1	–	–	–	–	–	–	–
RATE	25	–	–	–	–	–	–	–
LEVEL	24	–	–	–	–	–	–	–
SS/ED	ED	–	–	–	–	–	–	–

P ENV DEPTH	
DEPTH	WIDE
RANGE	63

P KF FOLLOW								
POINT	1	2	3	–	–	–	–	–
KEY	C2	F4	C7	–	–	–	–	–
LEVEL	40	63	40	–	–	–	–	–

1. Start with "Init Voice".
2. Enter the P KF LEVEL parameter.
3. Set the key numbers and levels as shown.
4. Play F4 and hold it. You will hear the pitch slide up two octaves.
5. Play C7, and then C2. You will hear no pitch change for either note.
6. Play and listen to other keys above and below F4. As you play keys farther and farther from F4, the pitch will change less and less.

This voice parameter allows you to scale the pitch envelope depth to the keyboard. Remember that the overall amount of pitch envelope effect is determined by the P ENV DEPTH setting.

Key Follow Rate

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

PITCH ENV								
STEP	1	–	–	–	–	–	–	–
RATE	25	–	–	–	–	–	–	–
LEVEL	24	–	–	–	–	–	–	–
SS/ED	ED	–	–	–	–	–	–	–

P ENV DEPTH	
DEPTH	WIDE
RANGE	63

KF RATE								
POINT	1	2	3	–	–	–	–	–
KEY	C2	F4	C7	–	–	–	–	–
LEVEL	0	10	20	–	–	–	–	–

1. Start with "Init Voice".
2. Enter the KF RATE parameter.
3. Set the key numbers and levels as shown.
4. Play the keys between C2 and C7. The pitch envelope rates will speed up as you play higher keys.

This voice parameter allows you to scale the pitch envelope rates to the keyboard. Keep in mind that KF RATE makes rates quicker, not slower than the current rate values set in PITCH ENV. If you plan on using KF RATE to change envelope rates, start off by programming the rates of PITCH ENV to the *slowest* values you want. Then use KF RATE to speed them up.

Pitch Velocity Level

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

PITCH ENV								
STEP	1	–	–	–	–	–	–	–
RATE	99	–	–	–	–	–	–	–
LEVEL	24	–	–	–	–	–	–	–
SS/ED	ED	–	–	–	–	–	–	–

P ENV DEPTH	
DEPTH	WIDE
RANGE	63

P VEL LEVEL	
SENS	31
CURVE	1

1. Start with "Init Voice".
2. Enter the P VEL LEVEL parameter.
3. Set the sensitivity and curve values as shown.
4. Play a single key repeatedly, using different velocities. Even though you are playing the same key over and over, you will hear a series of different pitches. The more velocity you use, the higher the pitch.
5. Repeat the previous step, but change the velocity curve value each time.

This voice parameter allows you to control the pitch envelope depth with the velocity with which you play the keys. Remember that the overall amount of pitch envelope effect is determined by the P ENV DEPTH settings.

Velocity Rate (DCO)

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

PITCH ENV								
STEP	1	2	3	4	5	6	7	8
RATE	99	0	99	0	99	0	99	0
LEVEL	4	5	8	9	12	13	16	17
SS/ED	–	–	–	–	–	–	–	ED
E/✳	✳	E	✳	E	✳	E	✳	E

P ENV DEPTH	
DEPTH	WIDE
RANGE	63

VEL RATE	
SENS	10
CURVE	1

1. Start with "Init Voice".
2. Enter the VEL RATE parameter.
3. Set the values as shown.
4. Play a single key repeatedly, using different velocities. The pitch envelope rates get quicker as you play with greater velocity.
5. Repeat the previous step, but experiment by enabling different steps in the envelope.
6. Reset to the original settings. Now, play and listen to each of the velocity curves.

This voice parameter allows you to scale the rates of any steps in the pitch envelope to velocity.

Vibrato

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

VIBRATO				
WAVE	DEPTH	RATE	DELAY	MULTI
TRIANGLE	25	75	0	OFF

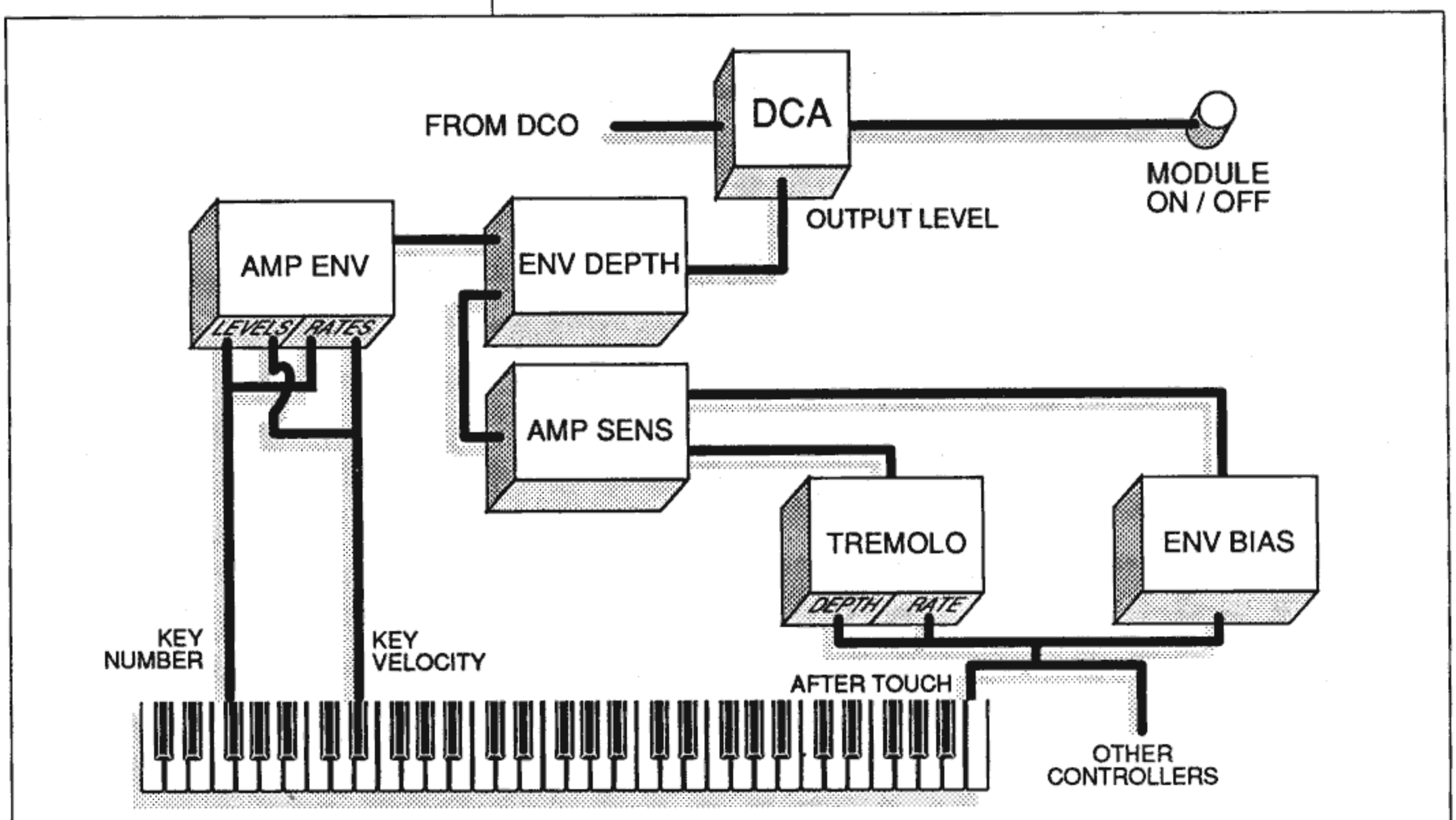
1. Start with "Init Voice".
2. Set the values as shown.
3. Play any key and listen. You will hear a steady vibrato.
4. Play each of the four vibrato waves. Each wave gives the vibrato a characteristic shape. Reset the wave value to "TRIANGLE".
5. Play and listen to different depth settings. The higher the depth value, the greater the pitch change. Reset the depth to its original value. Vibrato depth can be controlled by any of the VZ's controllers: wheels, after touch, foot pedal. If you want to hear vibrato only when you move a controller, be sure to set this depth value to zero. For now, set the depth to 50.
6. Set the rate to 35. Play some chords by holding down one finger at a time, until you are playing five keys at once. Notice that, no matter how you play them, the vibrato is synchronized for all the notes.
7. Set the multi value to "ON" and repeat the previous step. This time, the vibrato is not synchronized.
8. Until now, vibrato was heard as soon as you pressed a key. Play and listen to different delay settings. The higher the depth value, the longer you must hold down a key before you hear the vibrato effect fade in. The delay setting has no effect on vibrato depth, which is controlled by wheels, after touch or the foot pedal.

DCA Parameters

Here's a summary of the voice parameters associated with the DCA:

- AMP ENV: Creates an amp envelope that changes the output level of each module when notes are played.
- ENV DEPTH: Sets the overall depth of the amp envelope of each module.
- KF LEVEL: Varies amp envelope depth according to which keys are played.
- VEL LEVEL: Varies amp envelope depth according to the velocity used to play the note.
- KF RATE: Varies amp envelope rates according to which keys are played.
- VEL RATE: Varies amp envelope rates according to the velocity used to play the note.
- TREMOLO: Creates amplitude modulation effects.
- AMP SENS: Controls the overall depth of ENV BIAS and TREMOLO effects.
- TOTAL LEVEL: Acts as a "master volume" to control overall amplitude of all eight modules.

DCA Parameters



The following experiments will guide you through the different DCA parameters on the VZ.

Amp Envelope

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

AMP ENV								
STEP	1	2	3	4	5	6	7	8
RATE	50	50	50	50	50	50	50	50
LEVEL	99	0	99	0	99	0	99	0
SS/ED	–	–	–	–	–	–	–	ED

ENV DEPTH	
DEPTH	99

1. Start with "Init Voice".
2. Enter the ENV DEPTH parameter. Set the depth value to "99".
3. Enter the AMP ENV parameter.
4. Set the rates and levels as shown.
5. Set step 2 to "end".
6. Play any key. You will hear a note that begins with a slow attack and ends with a slow fade to silence.
7. Play and listen to notes with different rate settings for step 1 and 2. The higher the rate value, the faster the loudness change.
8. Reset both rates to 50.Play and listen to notes with different level settings for step 1 and 2. The higher the level value, the louder the sound.
9. Reset level 1 to 99 and level 2 to 0. Set step 8 to be the end step. Play any key and hold it. You will hear a note with four attacks, then the note fades to silence.
10. Play any key, but this time release the key as soon as you hear the first attack. Play it again, but this time release the key as soon as you hear the second attack. Play it once more, releasing the key as soon as you hear the third attack. In each case, the note starts to fade to silence as soon as the key is lifted. When a key is released, the envelope jumps directly to the end step if there is no sustain step.
11. Repeat the previous instruction, but each time move the location of the end step (from step 8, to step 7, to step 6, and so on). Notice that an envelope can end in silence or a held tone.
12. Reset the end step to step 8. Set the sustain step to step 1. Play any key and hold it. Now you will hear a single attack and a sustaining tone. Release the key and you will hear three attacks before the note fades out. When there is a sustain step, all of the steps between the sustain and end step are played when a key is released.
13. Repeat the previous instruction, but each time move the location of the sustain step (from step 1 to step 2, and so on). Notice that a note can sustain silence or a held tone.

The overall amount of the amp envelope effect is set with the depth parameter. It acts like a volume control for the module. If it is set to "0", no sound will be heard from the module, regardless of any other settings.

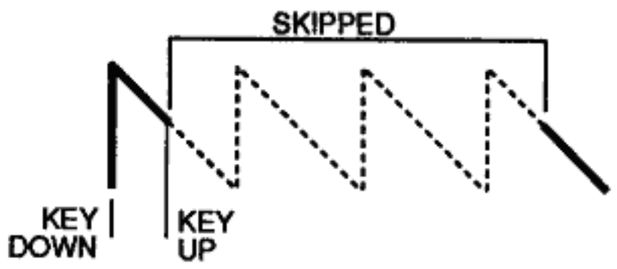
It is possible control the envelope depth value with the KF LEVEL and VEL LEVEL.

WITH SUSTAIN STEP

STEP	1	2	3	4	5	6	7	8
RATE	99	50	99	50	99	50	99	50
LEVEL	99	00	99	00	99	00	99	00
SS / ED	SS	-	-	-	-	-	-	ED

WITHOUT SUSTAIN STEP

STEP	1	2	3	4	5	6	7	8
RATE	99	50	99	50	99	50	99	50
LEVEL	99	00	99	00	99	00	99	00
SS / ED	-	-	-	-	-	-	-	ED



Key Follow Level

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

AMP ENV								
STEP	1	2	3	4	5	6	7	8
RATE	50	50	50	50	50	50	50	50
LEVEL	99	0	99	0	99	0	99	0
SS/ED	SS	–	–	–	–	–	–	ED

ENV DEPTH	
DEPTH	99

KF LEVEL								
POINT	1	2	3	4	–	–	–	–
KEY	C2	F4	F5	C9	–	–	–	–
LEVEL	99	99	1	0	–	–	–	–

1. Start with "Init Voice".
2. Enter the ENV DEPTH parameter. Set the depth value to "99".
3. Enter the AMP ENV parameter.
4. Set the rates and levels as shown.
5. Enter the KF LEVEL parameter.
6. Set the key numbers and levels as shown.
7. Play F4 and hold it. You will hear a note with four attacks.
8. Play and listen to keys below F4. They will all be of equal loudness.
9. Play and listen to keys between F4 and F5. The notes will become progressively softer as you play higher keys.
10. Play and listen to keys above F5. No sound will be heard.

This voice parameter allows you to scale the loudness of each module to the keyboard. This lets you create key splits or positional cross-fades within a single voice. (Be sure to read *Single Voice Key Splits and Cross Fades* in Part 3.). Remember, the overall loudness of a module is determined by the value of the amp envelope depth parameter.

Velocity Level

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

AMP ENV								
STEP	1	2	3	4	5	6	7	8
RATE	50	50	50	50	50	50	50	50
LEVEL	99	0	99	0	99	0	99	0
SS/ED	SS	–	–	–	–	–	–	ED

ENV DEPTH	
DEPTH	99

VEL LEVEL	
SENS	31
CURVE	3

1. Start with “Init Voice”.
2. Enter the ENV DEPTH parameter. Set the depth value to “99”.
3. Enter the AMP ENV parameter.
4. Set the rates and levels as shown.
5. Enter the VEL LEVEL parameter.
6. Set the sensitivity and curve values as shown.
7. Play a single key repeatedly, using different velocities. The more velocity you use, the louder the note.
8. Change the curve value to “4” and repeat the previous step. Now notes will get softer with greater velocity.
9. Play and listen to each of the different curves.

This voice parameter allows you to control the output level of each module with velocity. This lets you set up realistic piano-like dynamics, and effects like velocity cross fades.

Key Follow Rate

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

AMP ENV								
STEP	1	2	3	4	5	6	7	8
RATE	50	50	50	50	50	50	50	50
LEVEL	99	0	99	0	99	0	99	0
SS/ED	SS	–	–	–	–	–	–	ED

ENV DEPTH	
DEPTH	99

KF RATE								
POINT	1	2	3	–	–	–	–	–
KEY	C2	F4	C7	–	–	–	–	–
LEVEL	0	18	36	–	–	–	–	–

1. Start with “Init Voice”.
2. Enter the ENV DEPTH parameter. Set the depth value to “99”.
3. Enter the AMP ENV parameter.
4. Set the rates and levels as shown.
5. Enter the KF RATE parameter.
6. Set the key numbers and levels as shown.
7. Play and listen to keys between C2 and C7. The notes become more percussive as you play higher keys.

This voice parameter allows you to scale the amp envelope rates to the keyboard.

Velocity Rate (DCA)

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

AMP ENV								
STEP	1	2	3	4	5	6	7	8
RATE	50	50	50	50	50	50	50	50
LEVEL	99	0	99	0	99	0	99	0
SS/ED	SS	–	–	–	–	–	–	ED
E/✳	✳	E	✳	E	✳	E	✳	E

ENV DEPTH	
DEPTH	99

VEL RATE	
SENS	20
CURVE	1

1. Start with "Init Voice".
2. Enter the ENV DEPTH parameter. Set the depth value to "99".
3. Enter the AMP ENV parameter.
4. Set the rates and levels as shown.
5. Enter the VEL RATE parameter.
6. Set the values as shown.
7. Play a single key repeatedly, using different velocities. The more velocity you use, the more percussive the attacks of the notes become.
8. Repeat the previous step, but experiment by enabling different steps in the envelope.
9. Reset to the original settings.Now, play and listen to each of the velocity curves.

This voice parameter allows you to scale the rates of any steps in the amp envelope of each module to velocity.

Tremolo

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

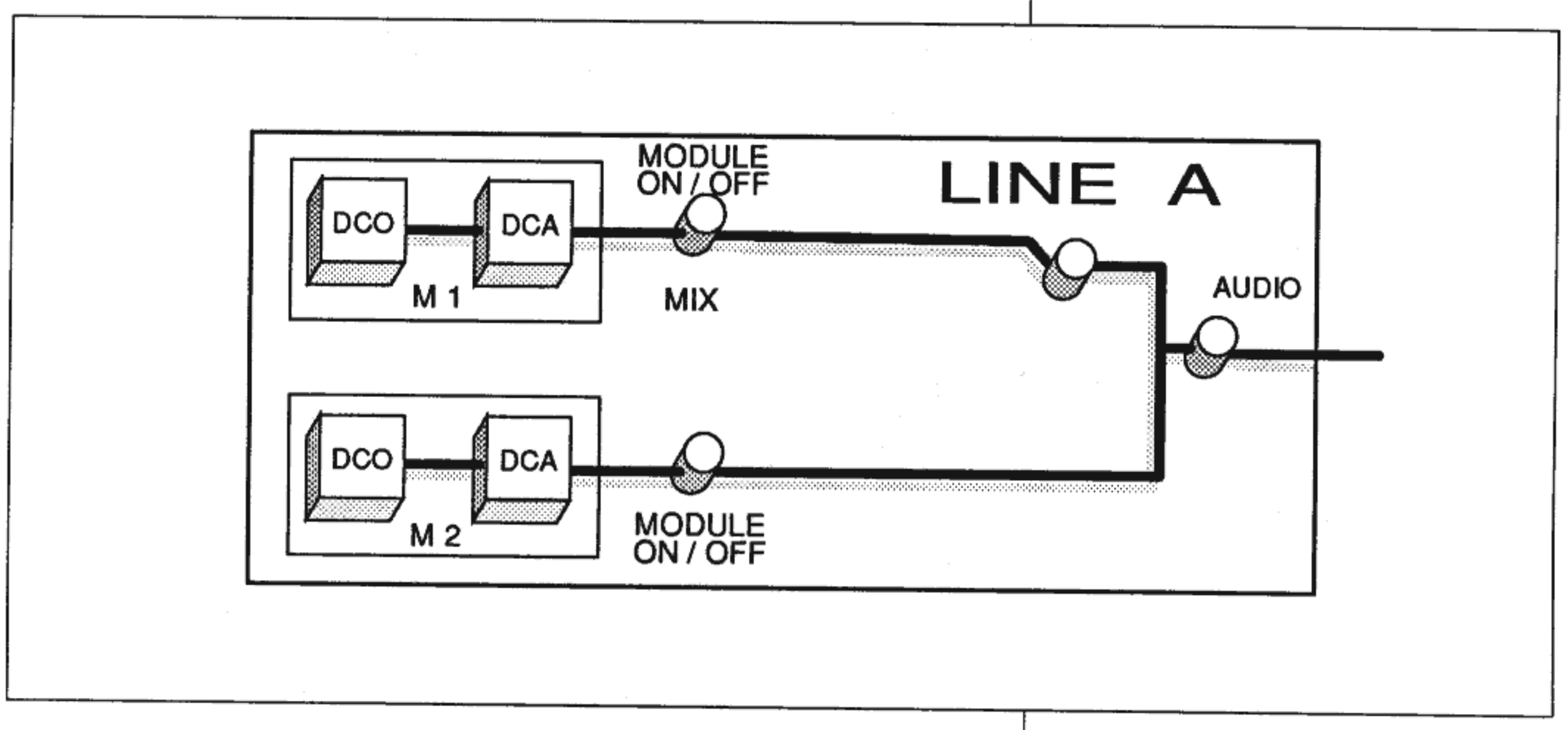
TREMOLO				
WAVE	DEPTH	RATE	DELAY	MULTI
TRIANGLE	50	50	0	OFF

1. Start with "Init Voice".
2. Enter the AMP SENS parameter and set the value to 7.
3. Enter the TREMOLO parameter.
4. Set the values as shown.
5. Play any key and listen. You will hear a steady tremolo.
6. Play and listen to each of the four tremolo waves. Each wave gives the tremolo a characteristic shape. Reset the wave value to "TRIANGLE".
7. Play and listen to different depth settings. The higher the depth value, the greater the loudness change. Reset the depth to the original value. Tremolo depth can be controlled by any of the VZ's controllers: wheels, after touch, foot pedal. If you want to hear tremolo only when you move a controller, be sure to set this depth value to "0".
8. Play some chords by holding down one finger at a time, until you are playing five keys at once. Notice that, no matter how you play them, the tremolo is synchronized for all the notes.
9. Set the multi value to "ON" and repeat the previous step. This time, the tremolo is not synchronized.
10. Until now, tremolo was heard as soon as you pressed a key. Play and listen to different delay settings. The higher the depth value, the longer you must hold down a key before you hear the tremolo effect fade in. The delay setting has no effect on tremolo depth controlled by wheels, after touch or the foot pedal.

Experimenting With Lines

A single VZ voice is made up of four *lines*. Each line is made up of two modules. The modules in a line can each be heard independently, or one module may modify the sound of another depending on the value of the LINE parameter. Here is a brief summary of the three different line values. (We use Line A, which consists or modules M1 and M2, for our examples here. Each line is identical except for their respective module numbers.)

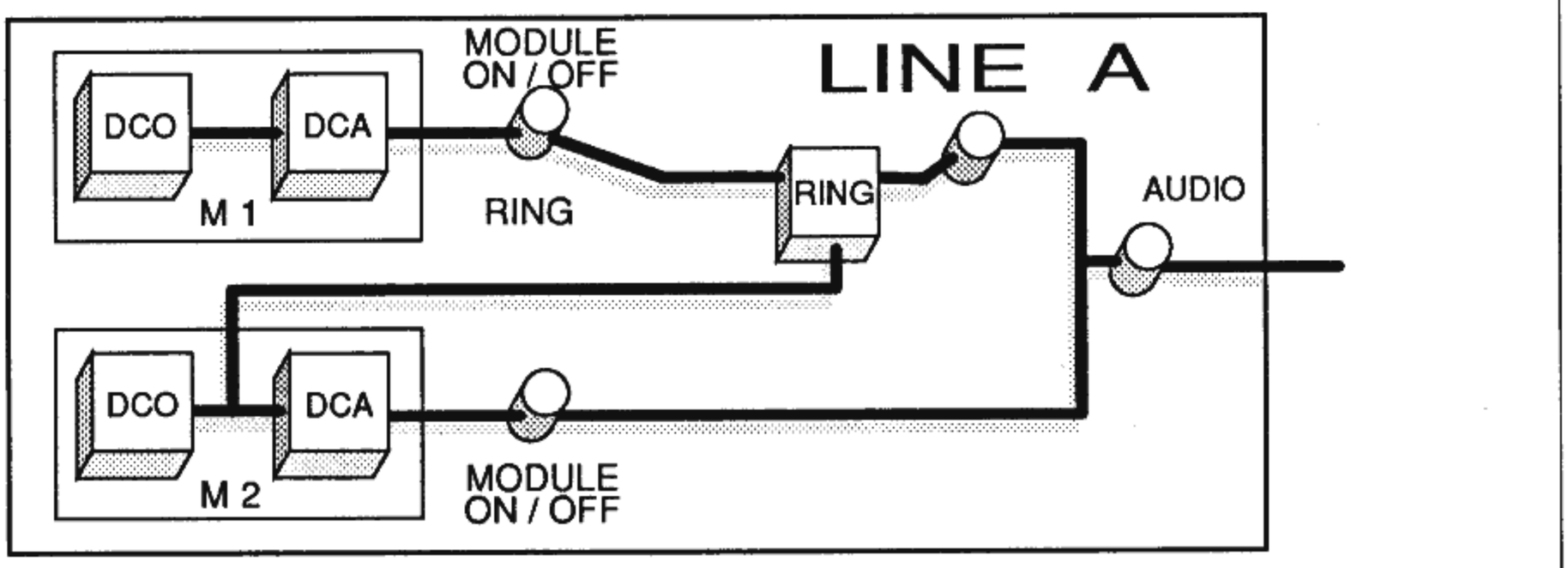
Mix



- The waveform, tuning and output level of each module is independent.
- Both modules are sound sources.

The modules don't interact with each other. M1 and M2 are both routed directly to the audio outputs of the VZ

Ring

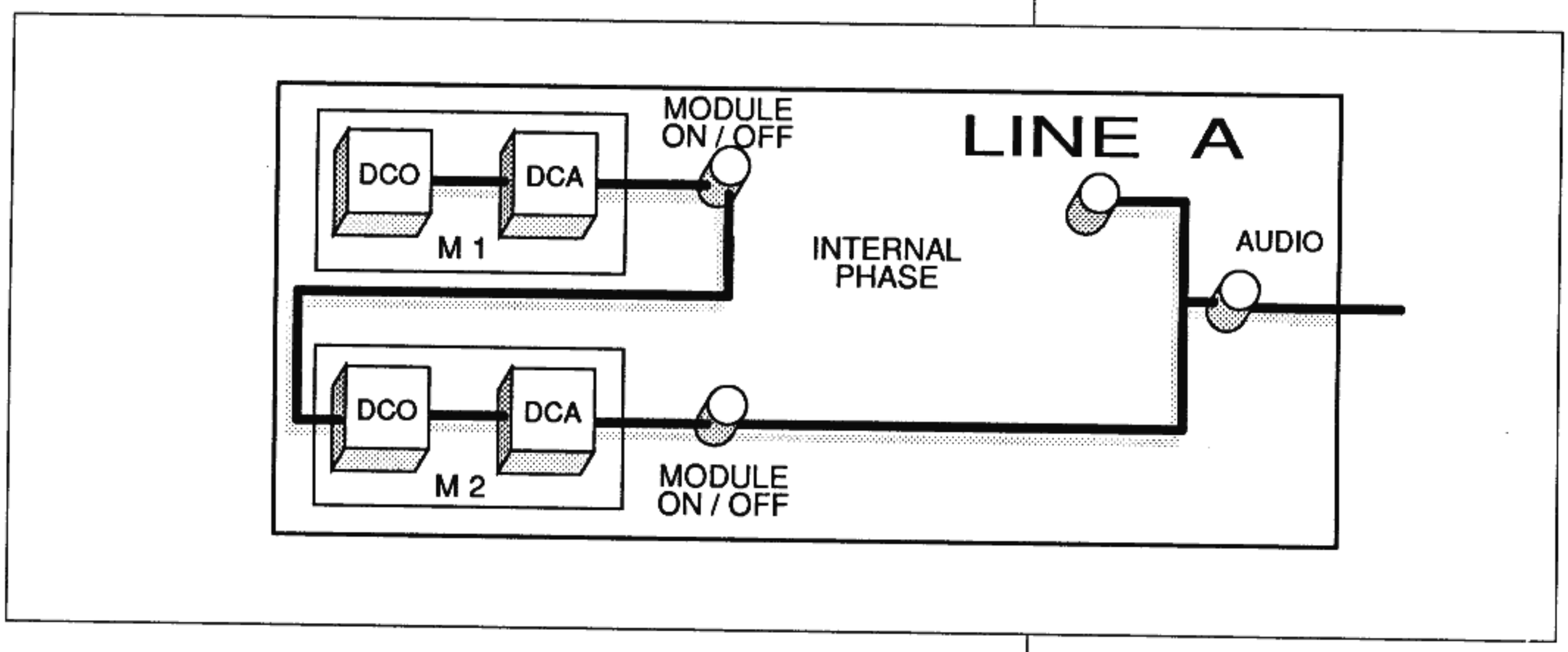


- The waveform, tuning and output level of each module is independent.
- M2 is a sound source *and* a modulator. It is routed directly to the audio outputs and its DCO is also routed to the ring modulator. M1 is routed directly to the ring modulator. The ring modulator is routed to the audio outputs.
- Listen to M1 alone to hear just the ring modulated sound. Listen to both to hear the ring modulated sound, and the unmodulated sound of M2 mixed together.

The modules interact as follows:

- The output of the DCO of M2 ring-modulates M1.
- The modulation level of this DCO is fixed and always on. It is unaffected by the amp envelope depth or the M2 on/off button.
- Changing the detune values of either M1 or M2 produce drastic changes to the timbre of the ring-modulated sound.
- Changing the waveform values of either M1 or M2 will produce subtle changes to the timbre of the ring-modulated sound.

Internal Phase



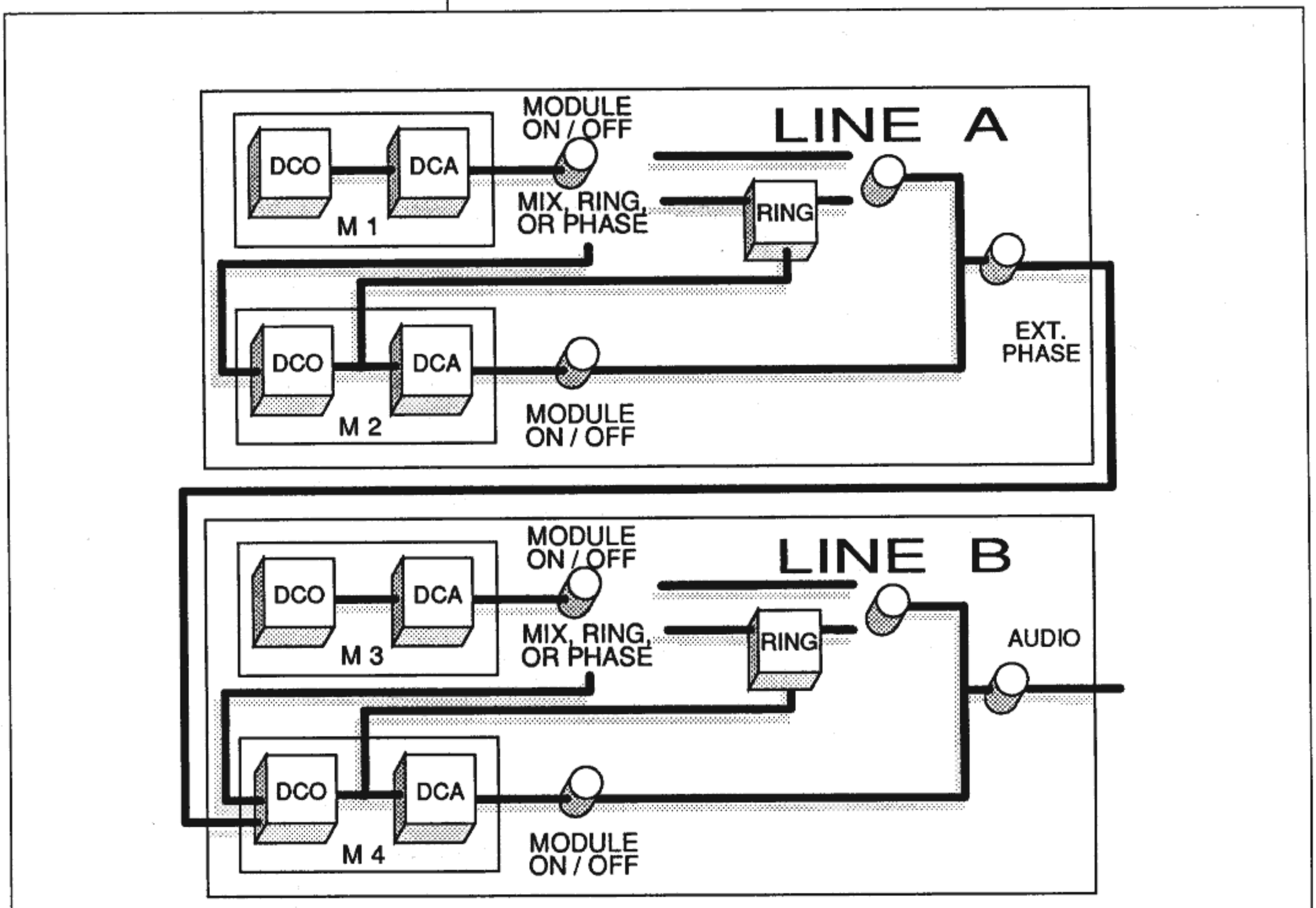
- The waveform and output level of each module is independent. Both modules are tuned to the current settings of the M1 DETUNE parameters. (M2 DETUNE settings have no effect when the line is set to phase.)
- M2 is a sound source. It is routed directly to the audio outputs. M1 is a modulator.
- You can't hear M1 directly, but you can hear its effect on the timbre of M2.
- Both modules must be on for you to hear the phase modulation effect.

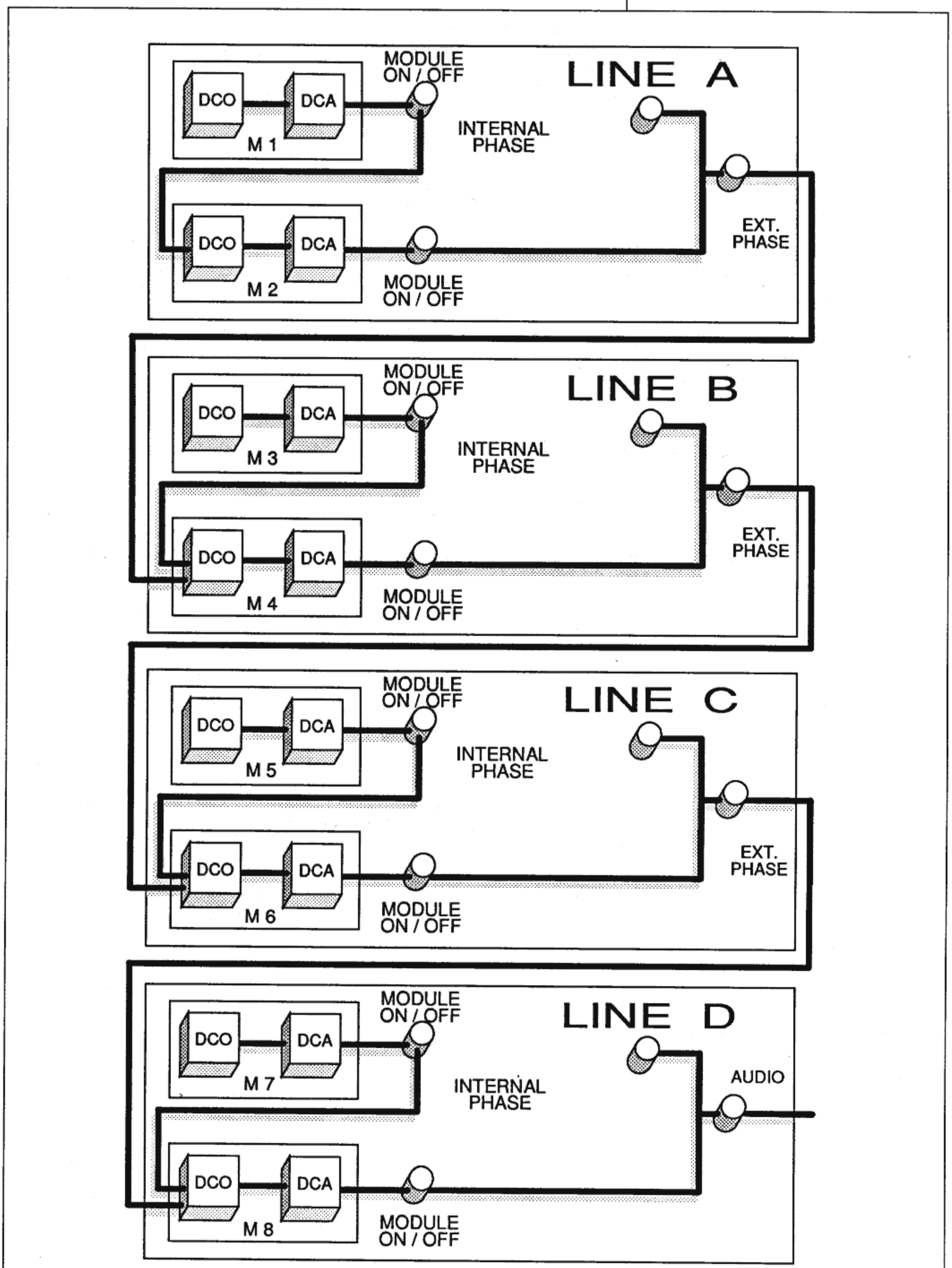
The modules interact as follows:

- The output of M1 phase modulates the DCO in M2.
- The modulation level is variable. It is determined by the output level of M1. The output level is controlled by all of the DCA voice parameters of M1.
- Changing the output level of M1 with the amp envelope, tremolo, or envelope bias functions, will change the timbre of the sound of M2. The higher the output level, the brighter the timbre.
- Changing the waveform values of either M1 or M2 will produce subtle changes in overall timbre.

External Phase

Lines B, C, and D have one additional configuration. The DCO of one module in each of these lines may be phase-modulated by the output of the line above it.




LINE A
DCO
DCA
M 1
MODULE ON / OFF
INTERNAL PHASE
DCO
DCA
M 2
MODULE ON / OFF
EXT. PHASE
LINE B
DCO
DCA
M 3
MODULE ON / OFF
INTERNAL PHASE
DCO
DCA
M 4
MODULE ON / OFF
EXT. PHASE
LINE C
DCO
DCA
M 5
MODULE ON / OFF
INTERNAL PHASE
DCO
DCA
M 6
MODULE ON / OFF
EXT. PHASE
LINE D
DCO
DCA
M 7
MODULE ON / OFF
INTERNAL PHASE
DCO
DCA
M 8
MODULE ON / OFF
AUDIO

The following experiments will demonstrate each of the different line configurations on the VZ.

Mix

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
MIX

DETUNE						
	FIX	HARMONIC	POLARITY	OCT	NOTE	FINE
M1	OFF	1/2	-	1	0	0
M2	OFF	1	+	0	0	0

AMP SENS							
M1	M2	M3	M4	M5	M6	M7	M8
7	0	–	–	–	-	–	–

EFFECT MENU

MOD WHEEL (DEF WHEEL 1)				
	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	OFF	–	–	–
TREM RATE	OFF	–	–	–
A ENV BIAS	ON	–	–	–

1. Start with "Init Voice" and set the parameters for M1 and M2 as shown. The output level of M1 can now be controlled by moving the mod wheel.
2. Hold down any key and move the mod wheel back and forth. You will hear the sound of M1 fade in and out with the motion of the wheel.
3. While listening to both modules, experiment with changing the WAVEFORM, DETUNE, and AMP ENV DEPTH settings of M1. Note that changes you make to the sound of M1 don't affect the sound of M2.
4. Repeat the previous step, but this time change the settings of M2. Note that changes you make to the sound of M2 don't affect the sound of M1.

Ring

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE
RING

DETUNE						
	FIX	HARMONIC	POLARITY	OCT	NOTE	FINE
M1	OFF	1	+	0	0	0
M2	OFF	1	+	0	0	0

AMP SENS							
M1	M2	M3	M4	M5	M6	M7	M8
0	7	–	–	–	-	–	–

EFFECT MENU

MOD WHEEL (DEF WHEEL 1)				
	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	OFF	–	–	–
TREM RATE	OFF	–	–	–
A ENV BIAS	ON	–	–	–

1. Start with "Init Voice" and set the parameters for M1 and M2 as shown. The output level of M2 can now be controlled by moving the mod wheel.
2. Hold down any key and move the mod wheel back and forth. You will hear the sound of M2 fade in and out with the motion of the wheel.
3. Turn M2 off by moving the mod wheel to its minimum position. When you play, you will hear only the output of the ring modulator.
4. Enter the DETUNE parameter.
5. Play one key repeatedly and change the value of the M2's NOTE parameter from "0" to "11"as you play. Use the mod wheel to turn M2 on and off. You will hear the timbre change as you change the tuning of M2. Reset the value to "0". Next, change the value of M1's NOTE parameter from "0" to "11"as you play. You will hear the timbre change as you change the tuning of M1. Note that the sound of M2 doesn't change. Reset the value to "0".
6. Experiment with changing the WAVEFORM, AMP ENV DEPTH , and remaining DETUNE settings of M1. Use the mod wheel to turn M2 on and off. Note that all of these changes affect only the ring-modulated sound of M1.
7. Repeat the previous step, but this time change the settings of M2. Note that the AMP ENV DEPTH settings of M2 have no effect on the ring modulated sound of M1, but all of the changes affect the sound of M2.

Internal Phase

NORMAL MODE

MODULE ON/OFF							
M1 ON	M2 ON	M3 OFF	M4 OFF	M5 OFF	M6 OFF	M7 OFF	M8 OFF

VOICE PARAMETER MENU

LINE
PHASE

DETUNE						
	FIX	HARMONIC	POLARITY	OCT	NOTE	FINE
M1	OFF	1	+	0	0	0
M2	OFF	1	+	0	0	0

AMP SENS							
M1	M2	M3	M4	M5	M6	M7	M8
7	0	–	–	–	-	–	–

EFFECT MENU

MOD WHEEL (DEF WHEEL 1)				
	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	OFF	–	–	–
TREM RATE	OFF	–	–	–
A ENV BIAS	ON	–	–	–

1. Start with "Init Voice" and set the parameters for M1 and M2 as shown. The output level of M1 can now be controlled by moving the mod wheel.
2. Hold down any key and move the mod wheel back and forth. You will hear the timbre of M2 grow brighter as the mod wheel is moved from minimum to maximum. Be aware that this timbre change can be produced by *any* voice parameters that affect the output level of M1. In other words, each of the DCA voice parameters can be used to control timbre changes.
3. Move the mod wheel to the maximum position. Turn M2 off with the module on/off key. Play any key. Note that you hear no sound even though M1 is on. Turn M2 back on. Remember, when set to phase, you cannot hear M1 directly — you can only hear its effect on the timbre of M2.
4. Enter the DETUNE parameter.
5. Play one key repeatedly and change the value of the of M1's NOTE parameter from "0" to "11"as you play. Note that the timbre of the sound doesn't change. The pitch of the sound moves up in half-steps.Reset the value to "0". Next, change the value of M2's NOTE parameter from "0" to "11"as you play. Nothing happens. Remember, when set to phase, the DETUNE values of M1 control the tunings of both modules in the line.The detune values of M2 have no effect on the sound.Reset the value to "0".
6. Experiment with changing the WAVEFORM and AMP ENV DEPTH settings of M1. Changing the waveform of M1 will change the overall timbre quality of the phase-modulated sound of M2. Changing the output level of M1 changes the overall depth (brightness) of the phase modulation effect.
7. Repeat the previous step, but this time change the WAVEFROM and AMP ENV settings of M2. The waveform setting changes the overall timbre of the phase-modulated sound of M2. The envelope depth changes the loudness of the phase modulated sound of M2.

External Phase

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	OFF	ON	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE		
	INT LINE	EXT PHASE
M1 M2	MIX	
M3 M4	MIX	ON

DETUNE						
	FIX	HARMONIC	POLARITY	OCT	NOTE	FINE
M1	OFF	1	+	0	0	0
M2	OFF	1	+	0	0	0

AMP SENS							
M1	M2	M3	M4	M5	M6	M7	M8
7	0	0	0	–	-	–	–

EFFECT MENU

MOD WHEEL (DEF WHEEL 1)				
	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	OFF	–	–	–
TREM RATE	OFF	–	–	–
A ENV BIAS	ON	–	–	–

1. Start with "Init Voice" and set the parameters for M1 through M4 as shown. The output level of M1 can now be controlled by moving the mod wheel.
2. Move the mod wheel to its minimum position and play any key. You will hear the sound of M4.
3. While holding down a key, slowly turn the mod wheel to its maximum position. You will hear the sound of the output of Line 1 phase modulating M4. (At this point, the output of Line 1 is only M1.)
4. When using external phase modulation, it is possible to use different tunings for the modulator and the sound source. Enter the DETUNE parameter for M1.
5. Play one key repeatedly and change the value of the of M1's HARMONIC parameter from "1" to "8"as you play. Note that the timbre of the sound changes drastically. Experiment with the other detune values, then reset the HARMONIC value to "1".
6. Repeat the previous step. This time change the DETUNE parameter for M4. Once again, the timbre of the sound will change drastically as the values are changed.

This experiment shows the basics of using external phase modulation. There are many variations left to try. For example, since M4 is modulated by the output of Line A you can turn on M2 and use *both* M1 and M2 to phase modulate M4. You will also get different results if you change Line A from MIX to RING, or PHASE. You can also set LINE B to MIX, RING or PHASE while M4 is modulated by Line 1. In addition, you can use external phase to link as many as four lines together in a phase modulation "chain". (See page 59.) The ability to set up these configurations shows one reason iPD is such a flexible and powerful means of sound synthesis.

Finding Your Way Around a VZ Sound

As we have seen, the eight modules in single VZ voice can be configured in many different ways. For almost all voices, a module will either affect the loudness or timbre of the overall sound. When you want to edit a sound to add in an effect like after touch control of loudness, or foot pedal control of timbre, you'll need to be able to determine which modules to control. Here's a quick and simple way to determine what each of the different modules is contributing to the overall sound of a voice.

For the VZ-1 and VZ-10M

- Push the MENU 1 button, and make a note of the active modules in the voice. Active modules are indicated by a red LED.
- Turn off all of the modules in the voice.
- Starting with module 1, turn on a module, play a key and listen. If you hear anything, that module is a loudness module (jot down the number if you want). Turn it off. Turn on the next module and listen again. Continue in this manner until you have "auditioned" all of the active modules. Modules that you heard when turned on, are loudness modules. Changing the output of these modules, either with their EGs, or with controllers (via the AMP SENS parameter) will affect the loudness of the sound. (These are the modules that you will want to control with after touch from a wind controller for dynamic expression.)
- Active, but silent, modules are phase, or ring modulators. These modules are "on", but produce no sound when auditioned with the above procedure Changing the output of these modules, either with their EGs, or with controllers (via the AMP SENS parameter) will affect the timbre of the sound.

For the VZ-8M

- Enter the Voice Parameter menu.
- Push the "on/off" key. Loudness modules are displayed as reverse-type numbers; timbre modules are displayed in normal type; inactive modules are indicated by a dot.

Part 3:
Editing Examples

Part 3: Editing Examples

In Part 2, we demonstrated how different voice parameters affect individual aspects of an overall sound. In this section of the book, we'll show you how to "put it all together" by using voice and effects parameters to create musically useful sounds and effects with your VZ.

If you'd like to know more about creating musical sounds and effects with any synthesizers, be sure to check out our book, **Synthesis With Style**.

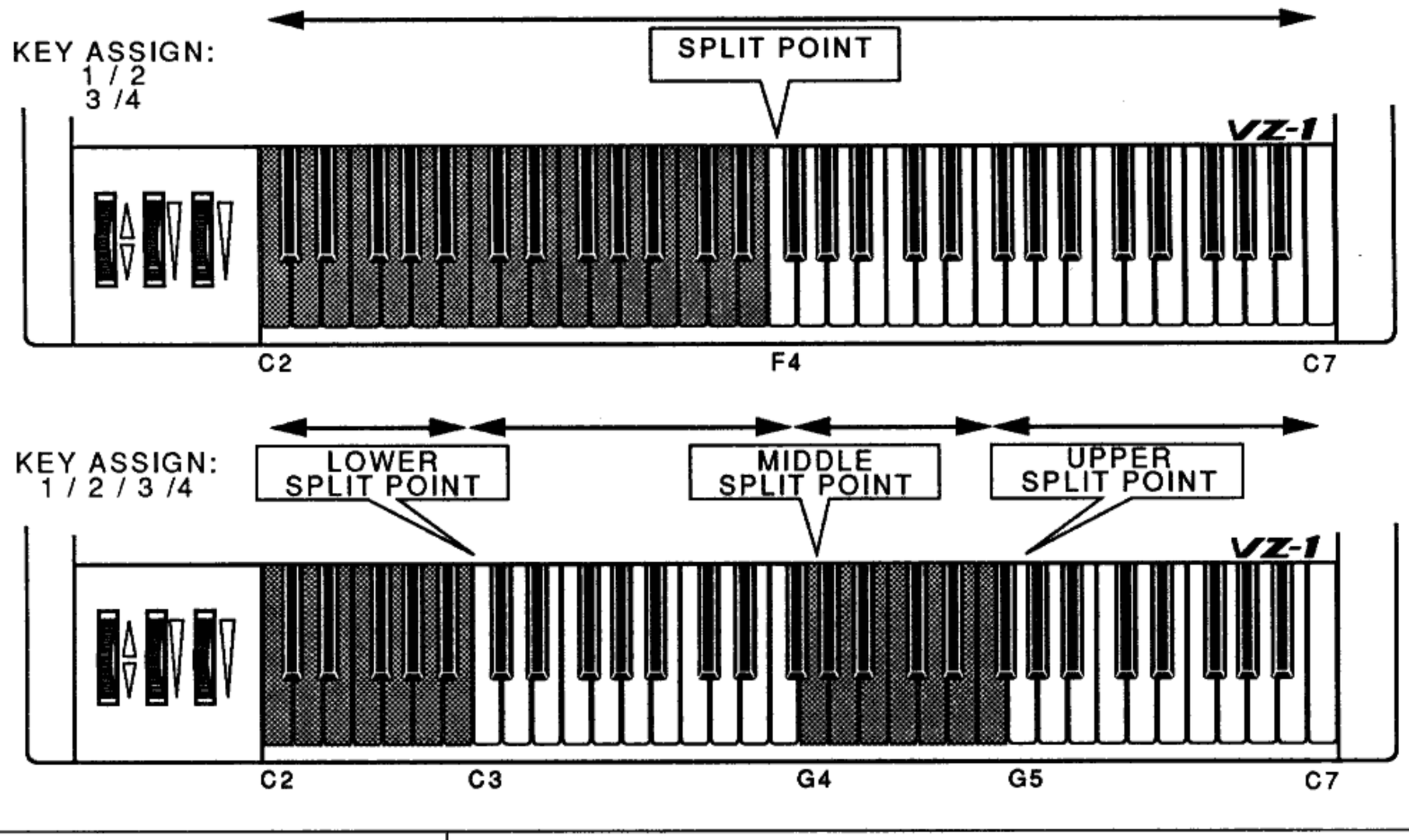
Combination Mode Key Assignments

There are several key assign configurations available in the combination mode (eight on the VZ-1 and VZ-10M and nine on the VZ-8M). With these different configurations, you can set up a number of multi-voice splits and layers. The polyphony and output assignment of each voice varies depending on the particular configuration. The following chart shows the details for each configuration.

PLAY MODE	AUDIO ASSIGNMENT		POLYPHONY			
NORMAL	LINE OUT 1	LINE OUT 2	VZ-1		VZ-8M	
NORMAL VOICE	1	1	16		8	
COMBINATION	LINE OUT 1	LINE OUT 2	VZ-1		VZ-8M	
1+2	1	2	8	8	4	4
3+4	3	4	8	8	4	4
1+2+3+4	1+2	3+4	4	4	2	2
1/3	1	3	8	8	4	4
1/3+4	1	3+4	8	8	4	4
1+2/3	1+2	3	4	4	2	2
1+2/3+4	1+2	3+4	4	4	2	2
1/2/3/4	1/2	3/4	4/4	4/4	2/2	2/2
1+2+3+4+5+6+7+8	1+2+3+4	5+6+7+8			1	1
MULTI CHANNEL	LINE OUT 1	LINE OUT 2	VZ-1		VZ-8M	
AREA 1	1	–	8		8	
AREA 2	2	–				
AREA 3	3	–				
AREA 4	4	–				
AREA 5	–	5		8		
AREA 6	–	6				
AREA 7	–	7				
AREA 8	–	8				

Combination Mode Split Key Assignments

These configurations allow you to split a keyboard, guitar, or wind controller, into two or four zones, each with a different voice. The following example shows how to set up a four zone split for keyboard, guitar, or wind controller.



How to set up a split keyboard

COMBINATION MODE

KEY ASSIGN
1 / 2 / 3 / 4

VOICE ASSIGMENT (VZ-1, VZ-10M & VZ-8M)											
1	NO.	D-3	2	NO.	C-6	3	NO.	B-1	4	NO.	H-1
	NAME	FRETLESS BASS		NAME	WARM ORGAN		NAME	R/B BRASS		NAME	VZ VIBES

EFFECT MENU

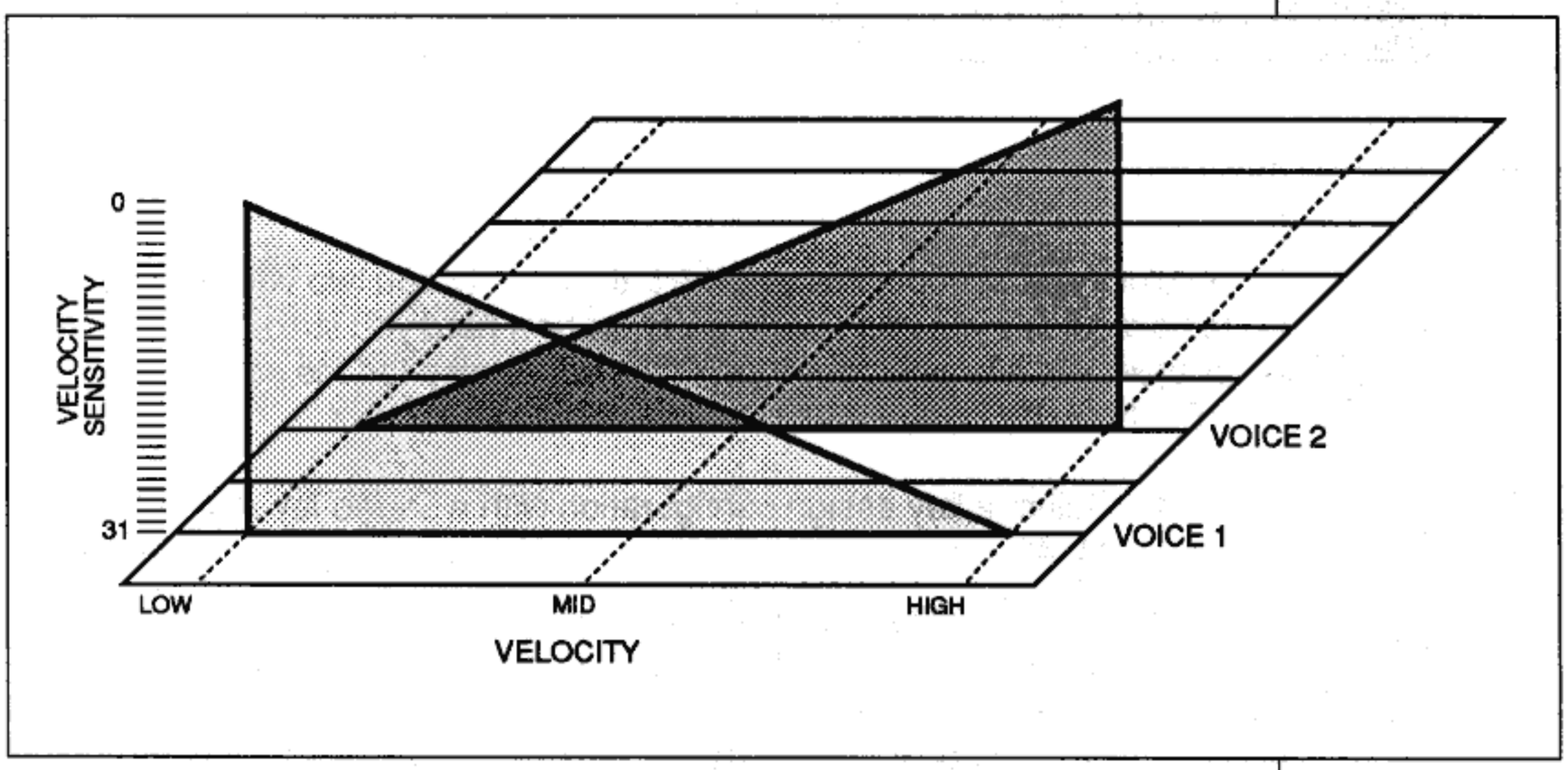
SPLIT POINT	
LOWER SP	C3
MIDDLE SP	G4
UPPER SP	G5

1. Select "the 1/2/3/4" key assign configuration.
2. Assign a different voice to each split as shown.
3. Set the SPLIT POINT ranges as shown.
4. Play notes and chords throughout the range of your instrument. With the voices and settings shown here you will hear bass below C3, organ between C3 and G4, brass between G4 and G5, and vibes above G5.
5. Experiment with different voice assignments and different split point ranges.

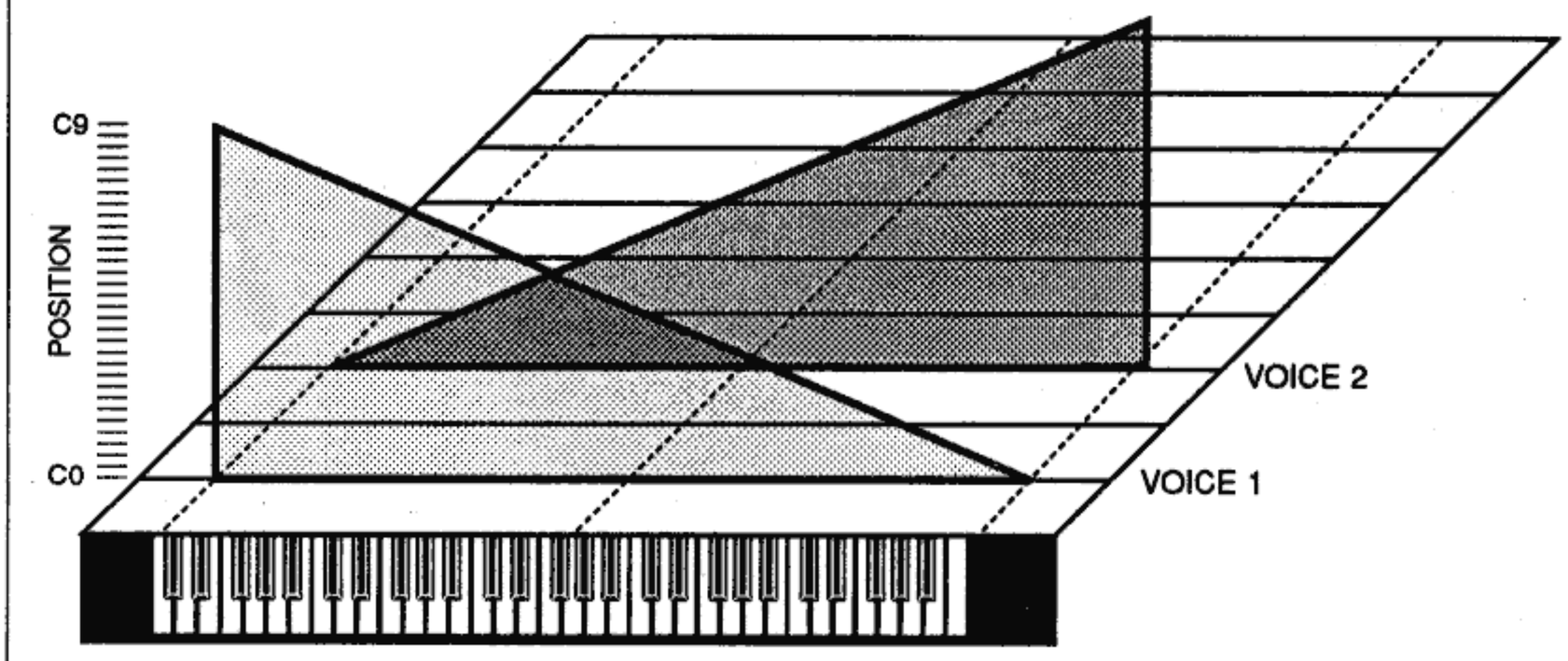
Combination Mode Layered Key Assignments

These configurations allow you to play two, four, or eight different voices from a single key. Within a layered configuration you can set up either a positional or velocity cross-fade. In a velocity cross-fade, the relative loudness of the layered voices is determined by velocity. One side of the layer gets louder as velocity increases, the other side gets louder as velocity decreases. In a positional cross-fade, the relative loudness of the layered voices is determined by the note played. The following examples demonstrate how to set up both types of cross-fades in the combination mode.

Velocity Cross-Fade



Positioal Cross-Fade



How to Set Up a Velocity Cross-Fade

COMBINATION MODE

KEY ASSIGN
1 + 2

VOICE ASSIGMENT (VZ-1, VZ-10M & VZ-8M)					
1	NO. / NAME	ANY VELOCITY SENSITIVE VOICE	2	NO. / NAME	ANY VELOCITY SENSITIVE VOICE

VOICE PARAMETER MENU

VEL LEVEL: VOICE 1 & 2								
	M1	M2	M3	M4	M5	M6	M7	M8
SENS	20	20	20	20	20	20	20	20
CURVE	3	3	3	3	3	3	3	3

EFFECT MENU

VEL INVERSE		
	1	2
INVERSE	ON	OFF

A velocity cross-fade changes the balance between two voices according to how quickly you push down a key (or how hard you strike a guitar string or blow into a breath controller.) A velocity cross-fade is set up using the VEL INVERSE function:

1. Select a key assign configuration with a stereo layer, like "1+2" or "3+4".
2. Assign a different velocity-sensitive voice to each side of the layer. Select voices that have already been programmed to produce velocity dynamics (see *Customizing Velocity Curves and Sensitivities*), or add velocity dynamics to any voice using the values shown as a guide.
3. Set the VEL INVERSE function for one of the voices to "on" for the voice you want to be loudest at the lowest velocities.

How to Set Up a Positional Cross-Fade

COMBINATION MODE

KEY ASSIGN: 1+2

VOICE ASSIGMENT (VZ-1, VZ-10M & VZ-8M)					
1	NO.	D-3	2	NO.	C-1
	NAME	FRETLESS BASS		NAME	VZ TRUMPET

EFFECT MENU

POS X FADE	
EFFECT	ON
POS (FROM)	C2
POS (TO)	C7

A positional cross-fade sets the balance between sounds according to where you play on your controller. In this example, the lowest notes will have a bass sound, and the highest notes will have a trumpet sound. Notes played in the middle of the controller range will be a mixture of both sounds.

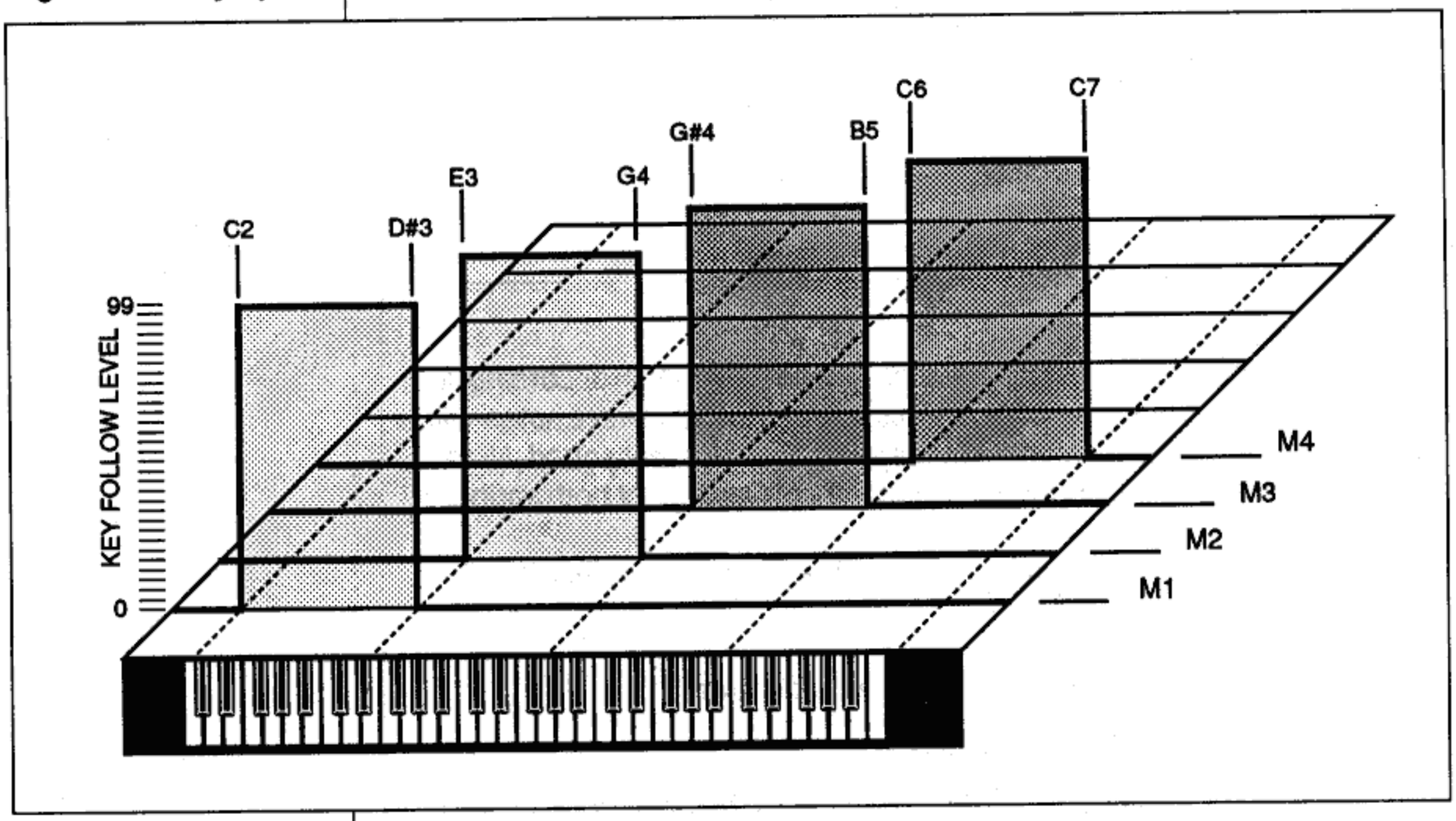
1. Select a key assign configuration with a stereo layer, like "1+2" or "3+4".
2. Assign a different voice to each layer as shown.
3. Set the X-FADE function to "on".
4. Set the "POS" values to the lowest and highest note of your keyboard, guitar, or wind controller (or to the lowest and highest note in the melody you want to cross-fade). The values shown here are for the VZ-1 keyboard.

Single Voice Key Assignments

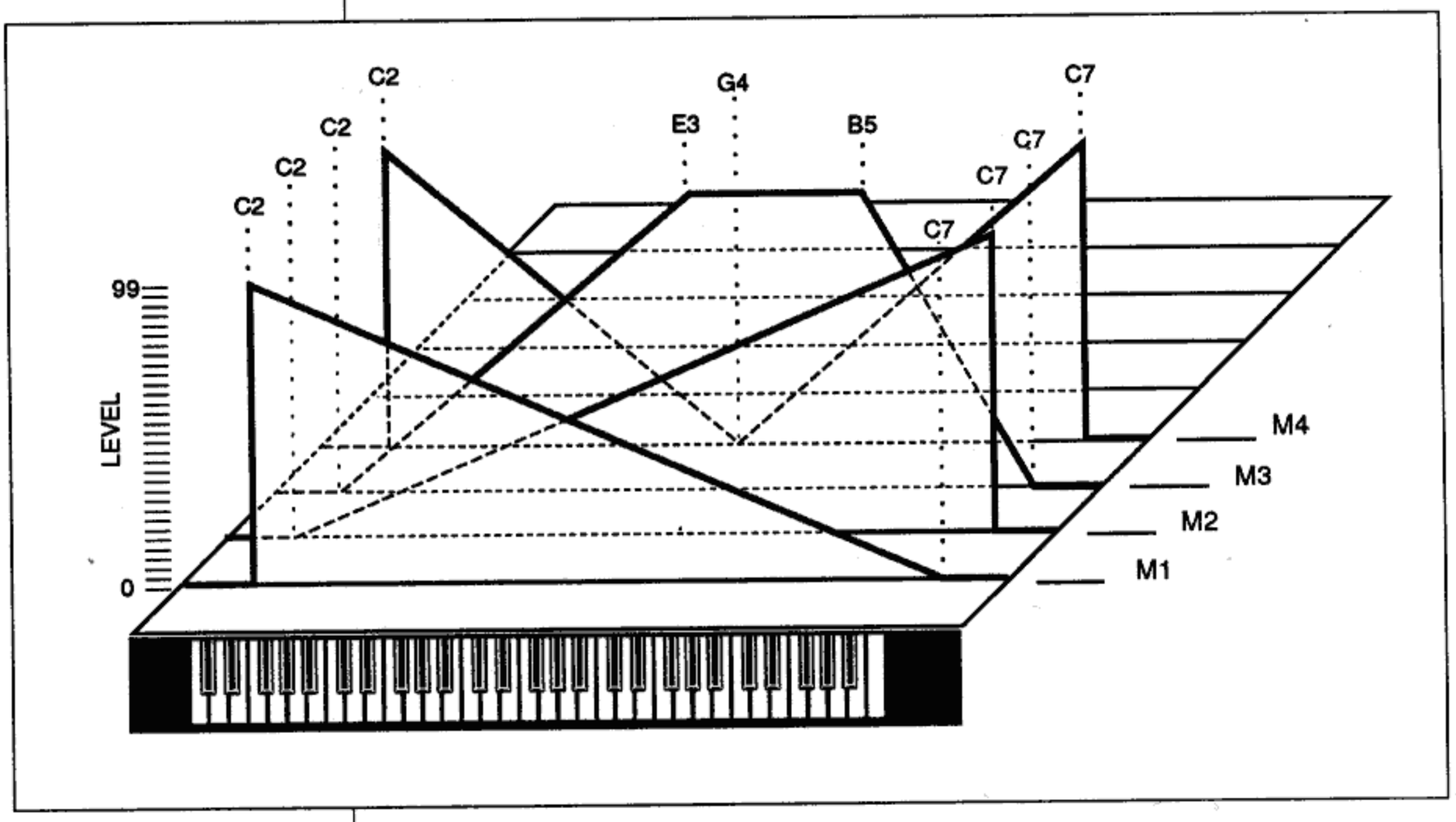
You can use the KF LEVEL parameter for to control the envelopes of iPD modules to create key splits within a single VZ voice. You can even set up positional cross-fades!

This is a very powerful feature for creating sounds for the PG-380's internal synthesizer, since it doesn't have the Combination mode.

Single Voice Key Split



Single Voice Positional Cross-Fade



Single Voice Key Splits and Cross-Fades

NORMAL MODE

MODULE ON/OFF							
M1 ON	M2 ON	M3 ON	M4 ON	M5 ON	M6 ON	M7 ON	M8 ON

VOICE PARAMETER MENU

LINE				
INT LINE	M1 M2	M3 M4	M5 M6	M7 M8
	MIX	RING	PHASE	PHASE

WAVEFORM							
M1	M2	M3	M4	M5	M6	M7	M8
SINE	SINE	SAW5	SINE	SINE	SINE	SAW2	SINE

DETUNE						
	FIX	HARMONIC	POLARITY	OCT	NOTE	FINE
M1	OFF	1	+	1	7	0
M2	OFF	4	-	2	0	0
M3	OFF	4	-	2	0	0
M4	OFF	1	-	1	0	0
M5	OFF	8	-	3	0	0
M6	OFF	1	-	1	0	0
M7	OFF	16	-	4	0	0
M8	OFF	1	-	1	0	0

KF LEVEL							
M1 M2	POINT	1	2	3	4	–	–
	KEY	C2	C4	C#4	C9	–	–
	LEVEL	99	99	0	0	–	–
M3 M4	POINT	1	2	3	4	5	6
	KEY	C2	C4	C#4	C5	C6	C9
	LEVEL	0	0	99	99	32	0
M5 M6	POINT	1	2	3	4	5	6
	KEY	C2	C5	C#5	C6	C#6	C9
	LEVEL	0	0	32	99	0	0
M7 M8	POINT	1	2	3	4	–	–
	KEY	C2	C6	C#6	C9	–	–
	LEVEL	0	0	99	99	–	–

This experiment demonstrates the basics of setting up key splits and positional cross-fades between modules and lines in a single voice.

1. Make a copy of "INIT VOICE" to use for this experiment.
2. Set the DETUNE and KF LEVEL parameters as shown. This will produce a voice that switches between Line 1 and Line 4, and cross-fades between Line 3 and Line 4.

Adding Portamento To VZ Sounds

Portamento is a smooth pitch glide from note to note. VZ synthesizers offer several portamento features. Here are some things to keep in mind:

- Each voice assigned in the combination mode can have different portamento settings.
- The PORTM TIME parameter determines how quickly the pitch slides between notes.
- The PORTM MODE parameter gives you two options for how the pitch slides. In the TIME CONST mode, the time it takes to slide between any two notes is always the same, no matter how far apart the two notes may be. In the RATE CONST mode, the time it takes to slide between notes increases with the distance between the notes.
- The SOLO parameter puts the VZ in a monophonic mode (no more than one note will sound at the same time). In this mode, portamento effects can be turned on and off with your playing style. When the SOLO parameter is set to "On", portamento will only be heard when you play *legato* (depress a new key before releasing the previous key). When you play *staccato* (release the key before depressing the next key) no portamento will be heard.
- You can create some interesting portamento effects in the combination mode by assigning different portamento parameters to each voice in a layered combination.

The following example will give you a quick tour of the different portamento features on the VZ.

NORMAL MODE

EFFECT MENU

PORTAMENTO / SOLO				
	1	2	3	4
PORTM ON / OFF	ON	–	–	–
PORTM TIME	85	–	–	–
PORTM MODE	0	–	–	–
SOLO	0FF	–	–	–

1. Select any voice.
2. Enter the PORTM/SOLO parameter and set the values as shown.
3. Play C2, release it, and play C5. Hold down C5 until the pitch stops rising. Note the time it takes for the pitch to slide three octaves.
4. Repeat the previous step, but this time play C3 instead of C5. Note that it takes the same amount of time for the pitch to slide one octave as it did to slide three octaves. This demonstrates the TIME CONST mode. The time it takes to slide between any two notes is the same, regardless of the interval played.
5. Set the portamento mode to "1" (RATE CONST) and repeat steps 3 and 4.
6. You will hear that it takes more time for the pitch to slide three octaves than it does to slide one octave. This demonstrates the RATE CONST mode. The rate of the slide is constant, regardless of the interval played. This means that it takes longer to slide between large intervals than between small ones.

Adding Vibrato To VZ Sounds

NORMAL MODE

(TRY THIS WITH D3: JAZZ GUITAR)

VOICE PARAMETER MENU

VIBRATO				
WAVE	DEPTH	RATE	DELAY	MULTI
TRIANGLE	10	65	20	OFF

WHEN THIS IS GREATER THAN 0, THE VIBRATO EFFECT WILL BE HEARD ALL OF THE TIME

ANY VZ CONTROLLER CAN BE USED TO CONTROL VIBRATO DEPTH OR RATE

EFFECT MENU

WHEEL OR ANY CONTROLLER				
	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	ON	–	–	–
VIB RATE	ON	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	OFF	–	–	–
TREM RATE	OFF	–	–	–
A ENV BIAS	OFF	–	–	–

Here is a simple to procedure to follow when you want to add vibrato to a preset that has none, or to edit existing vibrato settings.

1. Start with any voice.
2. Enter the VIBRATO parameter.
3. Set the VIBRATO wave to "TRIANGLE".
4. For vibrato that is "on" all the time, set the VIBRATO depth value between "10" and "99". Otherwise, set this value to "0" and set a controller for vibrato depth. (See *Vibrato Rate and Depth.*)
5. Set the speed of the vibrato effect with the VIBRATO rate value. Higher numbers produce faster vibrato. You can also control the rate of the vibrato with a controller. (See *Vibrato Rate and Depth.*)
6. To create a delayed vibrato effect set the VIBRATO delay value to a number greater than "0". The higher the number, the longer the delay before the vibrato fades in.

When you're ready to save the sound, remember that the effects menu settings for vibrato depth, and vibrato rate aren't saved with the voice parameters. If you want to save the effects settings, first save the voice in the normal mode, then save the entire normal mode work area by saving to an operation memory.

Adding Loudness Tremolo to VZ Sounds

NORMAL MODE

(TRY THIS WITH A7: HEAVY CLAVI)

VOICE PARAMETER MENU

TREMOLO				
WAVE	DEPTH	RATE	DELAY	MULTI
TRIANGLE	40	70	0	OFF

WHEN THIS IS GREATER THAN 0, THE TREMOLO EFFECT WILL BE HEARD ALL OF THE TIME

ANY VZ CONTROLLER CAN BE USED TO CONTROL TREMOLO DEPTH OR RATE

EFFECT MENU

WHEEL OR ANY CONTROLLER				
	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	ON	–	–	–
TREM RATE	ON	–	–	–
A ENV BIAS	OFF	–	–	–

AMP SENS							
M1	M2	M3	M4	M5	M6	M7	M8
0	0	0	7	0	0	0	7

LOUDNESS MODULES

One way to add some life to preset voices is to add a little (or a lot) of tremolo. VZ tremolo can be used to create more effects than "normal" tremolo. We'll show you how to use it to create echoes and stereo auto panning too. Here is a basic procedure to add tremolo to any VZ voice.

1. Find the loudness modules in the sound. (See *Finding Your Way Around a VZ Sound.)*
2. Set the AMP SENS value for the loudness modules to "7".
3. Set the TREMOLO wave to "TRIANGLE".
4. For tremolo that is "on" all the time, set the TREMOLO depth value between "10" and "99". Otherwise, set this value to "0" and set a controller for tremolo depth.
5. Set the speed of the tremolo effect with the TREMOLO rate value. Higher numbers produce faster tremolo. You can also control the rate of the tremolo with a controller.
6. To create a delayed tremolo effect set the TREMOLO delay value to a number greater than "0". The higher the number, the longer the delay before the tremolo fades in.

When you're ready to save the sound, remember that the effects menu settings for tremolo depth, and tremolo rate aren't saved with the voice parameters. If you want to save the effects settings, first save the voice in the normal mode, then save the entire normal mode work area by saving to an operation memory.

Adding Timbre Tremolo (Wah Wah) to VZ Sounds

NORMAL MODE

(TRY THIS WITH A7: HEAVY CLAVI)

VOICE PARAMETER MENU

TREMOLO				
WAVE	DEPTH	RATE	DELAY	MULTI
TRIANGLE	40	70	0	OFF

WHEN THIS IS GREATER THAN 0, THE TREMOLO EFFECT WILL BE HEARD ALL OF THE TIME

ANY VZ CONTROLLER CAN BE USED TO CONTROL TREMOLO DEPTH OR RATE

EFFECT MENU

WHEEL OR ANY CONTROLLER				
	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	ON	–	–	–
TREM RATE	ON	–	–	–
A ENV BIAS	OFF	–	–	–

AMP SENS							
M1	M2	M3	M4	M5	M6	M7	M8
7	7	7	0	7	7	7	0

TIMBRE MODULES

Wah wah is a smooth timbre sweep. You can create an automatic wah wah effect in voices that use phase modulation to create timbre changes. The technique is nearly identical to the one used to create loudness tremolo. The only difference is that you control the timbre modules instead of loudness modules. Here's how:

1. Find the timbre modules in the sound. (See *Finding Your Way Around a VZ Sound.*)
2. Set the AMP SENS value for the timbre modules to "7".
3. Set the TREMOLO wave to "TRIANGLE".
4. For wah wah that is "on" all the time, set the TREMOLO depth value between "10" and "99". Otherwise, set this value to "0" and set a controller for tremolo depth. The foot pedal and after touch are good choices for wah wah.
5. Set the speed of the wah wah effect with the TREMOLO rate value. Higher numbers produce faster wah wah. You can also control the rate of the wah with a controller.
6. To create a delayed wah wah effect set the TREMOLO delay value to a number greater than "0". The higher the number, the longer the delay before the wah wah fades in.

When you're ready to save the sound, remember that the effects menu settings for tremolo depth and tremolo rate aren't saved with the voice parameters. If you want to save the effects settings, first save the voice in the normal mode, then save the entire normal mode work area by saving to an operation memory.

Adding Controller Effects to VZ Sounds

VZ synthesizers can be controlled by five different controllers: after touch, mod wheel, def cntrol, and foot vr. For each controller you can select the depth and polarity of control, as well as choose from a menu of seven destination parameters. The destination parameters are: vibrato depth, vibrato rate, pitch, portamento time, tremolo depth, tremolo rate, and amplitude envelope bias.

- Each of the destination parameters is associated with a specific voice parameter menu, so any changes made by a controller will be in addition to those already programmed into a voice.
- The overall response to tremolo and amplitude envelope bias control is determined by the value of the AMP SENSITIVITY voice parameter. You can set a different value for each module in a voice. This allows you to choose which modules will respond to controller changes, as well as the range of each module's response. (See pages 82,83.)
- In the combination mode, there is a separate set of controller menus for each voice in the combination. This makes it possible, for example, to control two voices in different ways from the same controller.
- In the multi channel mode, there is a separate set of controller menus for each MIDI area. This makes it possible to control each voice only with controllers assigned to its area's MIDI channel.

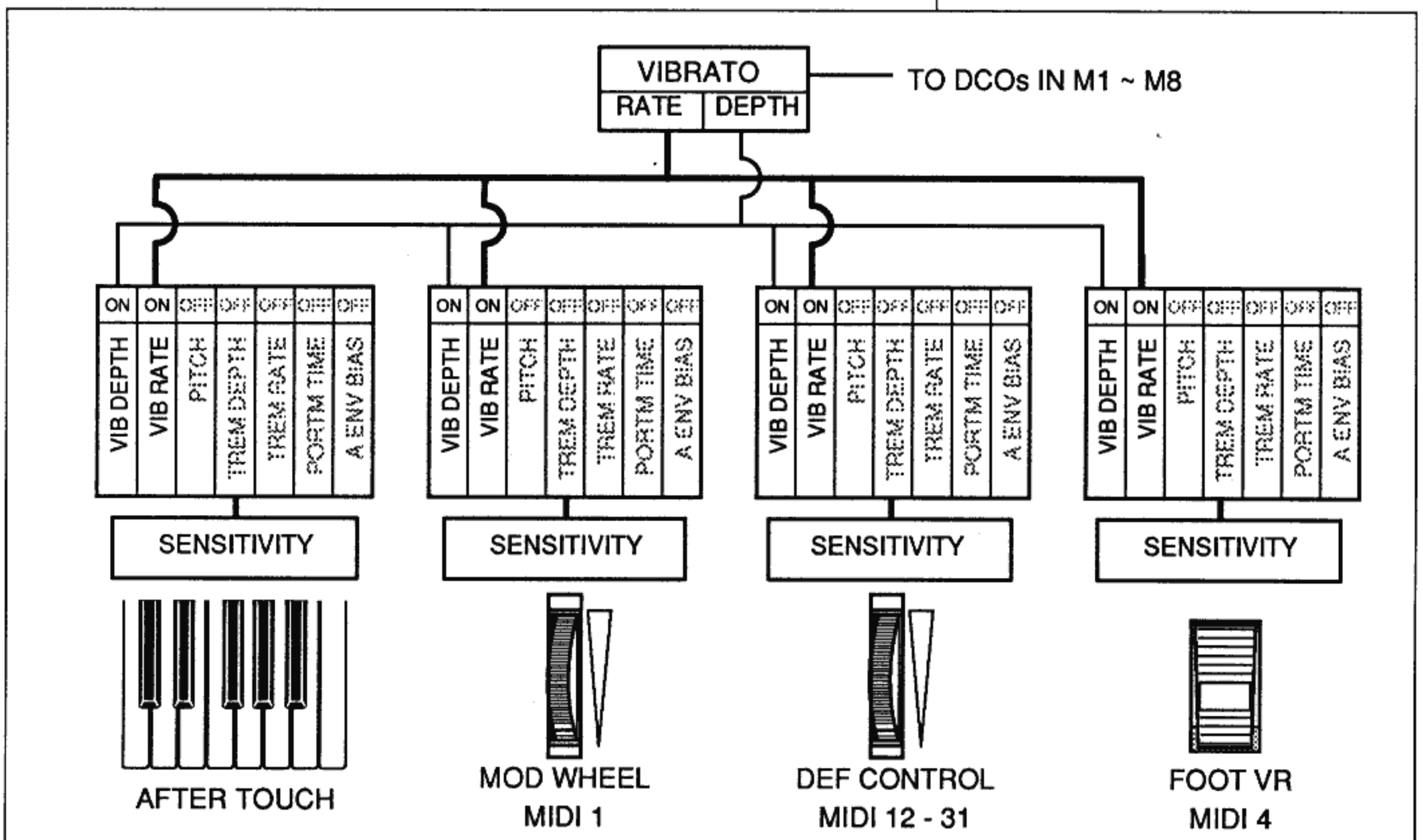
Since each of the controller menus offers the same destinations, the types of effects you can create with each controller are exactly the same. The only difference is the type of controller used to bring the effect in and out while you are playing. Here are some guidelines to keep in mind:

- After touch allows you to add controller effects while keeping both hands on the keyboard, or while you are sustaining a note with breath pressure.
- Both after touch and the VZ-1's def wheel 1 are "return to zero" controllers. Whatever effect they are producing will stop when the keys, wheel, or breath pressure, is released.
- Other controllers, like the mod wheel, def control, and foot VR, are "set and forget" controllers. Whatever effect they are producing will remain constant until you move them again.

The following examples demonstrate how to connect different controllers to the various destinations.

Vibrato Rate and Depth

You can control both the rate and depth of vibrato effects for a voice independently, or from the same controller.



Controlling Vibrato Rate and Depth

EFFECT MENU

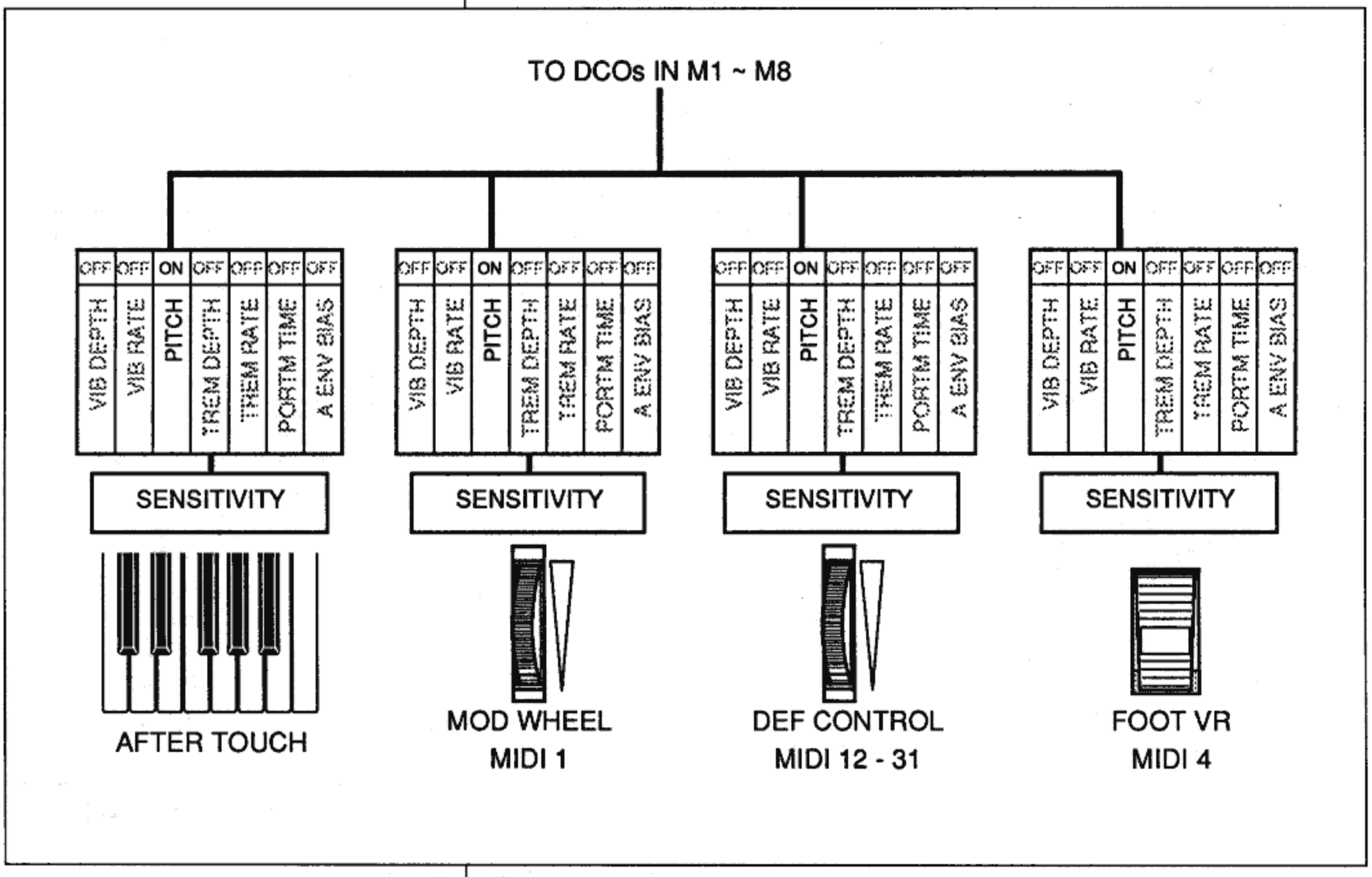
WHEEL OR ANY CONTROLLER	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	ON	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	OFF	–	–	–
TREM RATE	OFF	–	–	–
A ENV BIAS	OFF			

WHEEL OR ANY CONTROLLER	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	ON	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	OFF	–	–	–
TREM RATE	OFF	–	–	–
A ENV BIAS	OFF			

EACH CONTROLLER CAN PRODUCE DIFFERENT EFFECTS ON FOUR VOICES AT ONCE IN THE COMBINATION MODE

Pitch

You can use any controller to slide the pitch of a voice as much as one octave up or down. Positive sensitivity values will move the pitch up; negative sensitivity values will move the pitch down. In the Combination mode, you can use this to slide each voice to a different interval above or below its normal tuning to create chords.



Controlling Pitch

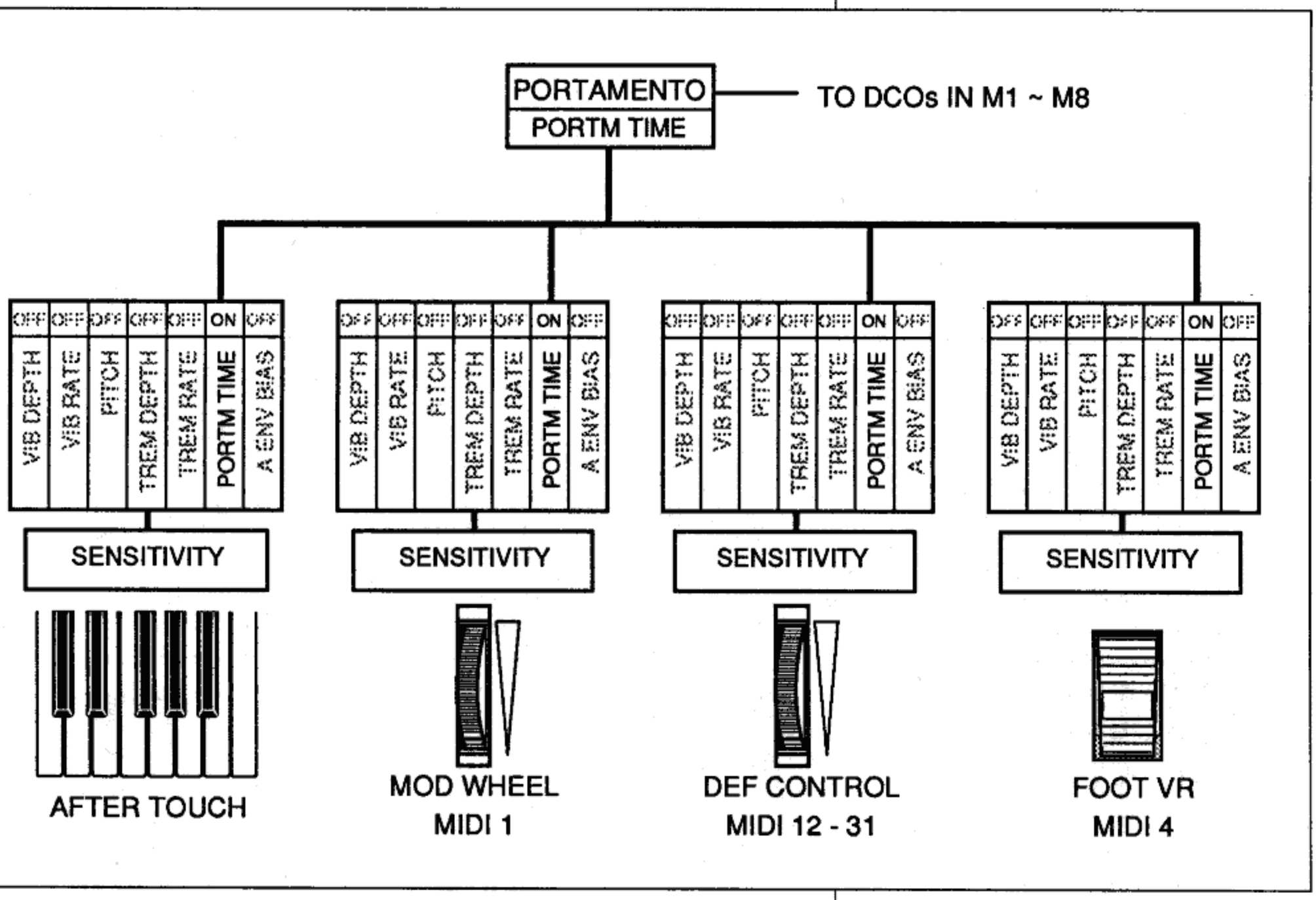
EFFECT MENU

WHEEL OR ANY CONTROLLER	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	ON	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	OFF	–	–	–
TREM RATE	OFF	–	–	–
A ENV BIAS	OFF			

EACH CONTROLLER CAN PRODUCE DIFFERENT EFFECTS ON FOUR VOICES AT ONCE IN THE COMBINATION MODE

P-time

You can use any controller to alter the portamento rate.



Controlling Portamento Time

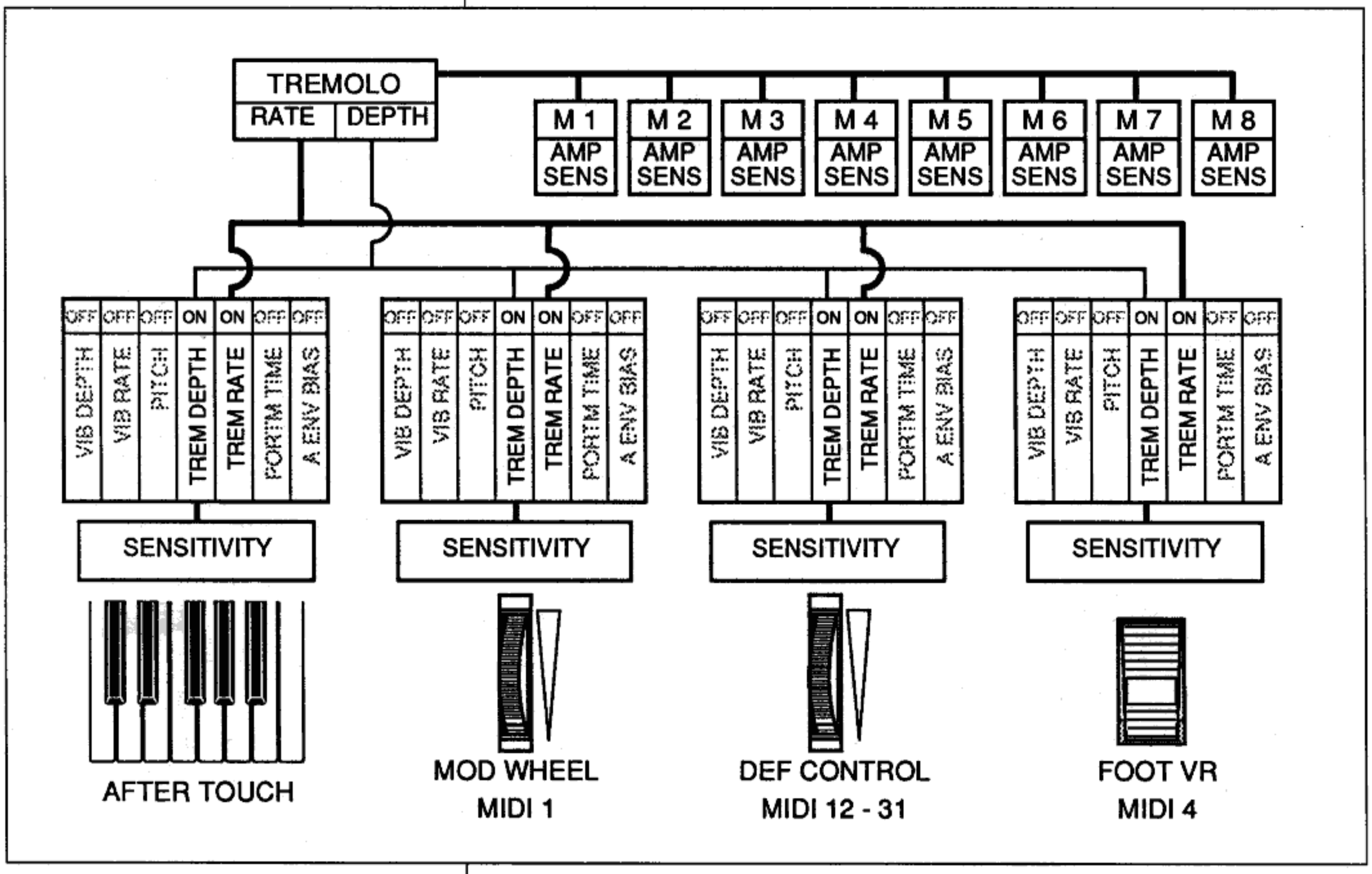
EFFECT MENU

WHEEL OR ANY CONTROLLER	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	ON	–	–	–
TREM DEPTH	OFF	–	–	–
TREM RATE	OFF	–	–	–
A ENV BIAS	OFF	–	–	–

EACH CONTROLLER CAN PRODUCE DIFFERENT EFFECTS ON FOUR VOICES AT ONCE IN THE COMBINATION MODE

Tremolo Rate and Depth

You can control both the rate and depth of tremolo effects for a voice independently, or from the same controller. Remember, only modules with AMP SENS values set to a value greater than zero will respond to controllers assigned to tremolo depth. (See *Tremolo.*)



Controlling Tremolo Rate and Depth

EFFECT MENU

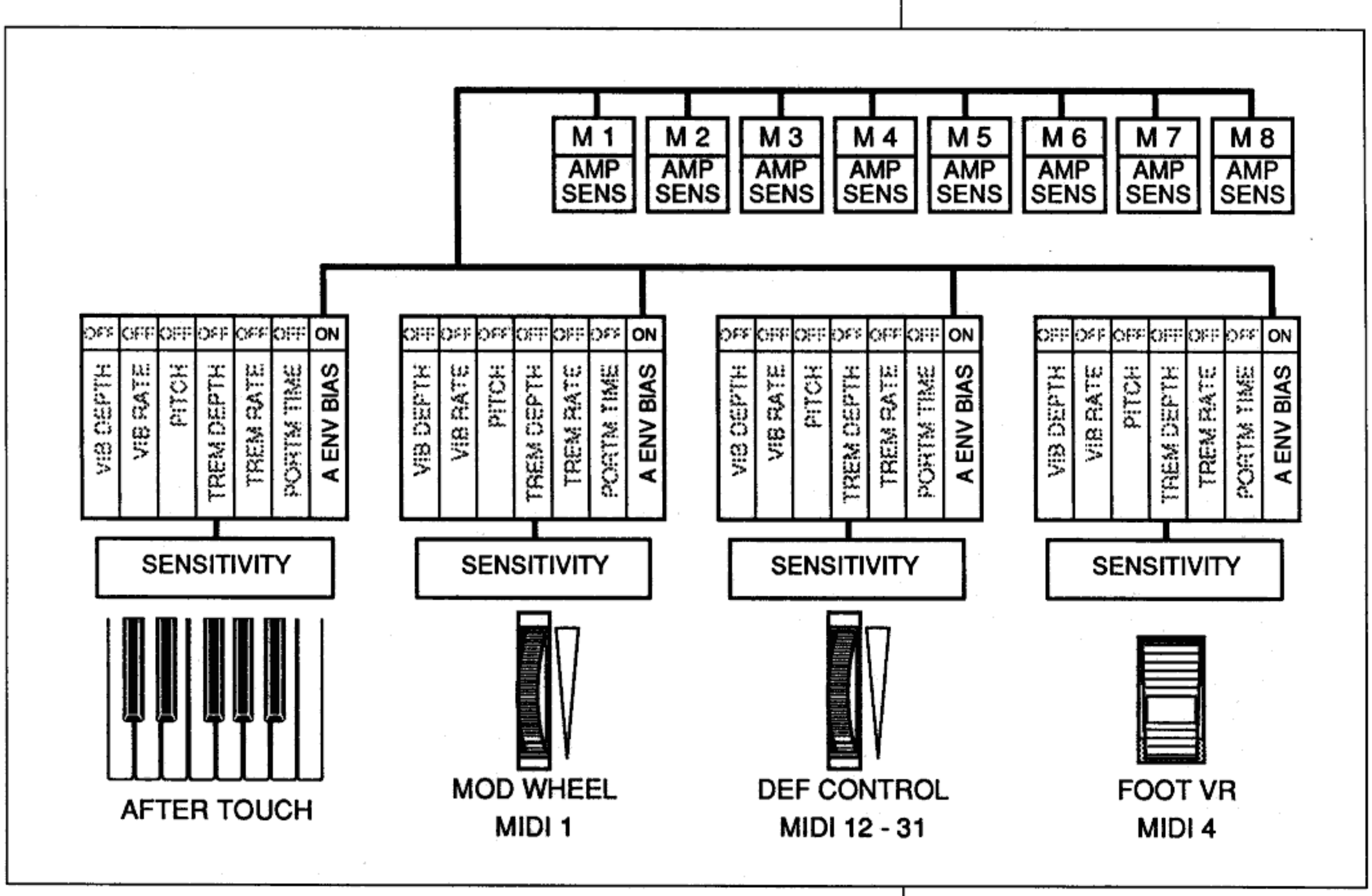
WHEEL OR ANY CONTROLLER	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	ON	–	–	–
TREM RATE	OFF	–	–	–
A ENV BIAS	OFF			

WHEEL OR ANY CONTROLLER	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	OFF	–	–	–
TREM RATE	ON	–	–	–
A ENV BIAS	OFF			

EACH CONTROLLER CAN PRODUCE DIFFERENT EFFECTS ON FOUR VOICES AT ONCE IN THE COMBINATION MODE

Amp Bias

You can control the output level of any module in a voice that has an AMP SENS value of greater than zero. Controlling the amp bias of loudness modules will produce loudness changes. Controlling the amp bias of timbre modules will produce timbre changes.



Controlling Amp Bias

(A ENV BIAS WILL ONLY EFFECT MODULES WITH AMP SENS SETTINGS GREATER THAN 0)

EFFECT MENU

WHEEL OR ANY CONTROLLER				
	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	OFF	–	–	–
TREM RATE	OFF	–	–	–
A ENV BIAS	ON	–	–	–

EACH CONTROLLER CAN PRODUCE DIFFERENT EFFECTS ON FOUR VOICES AT ONCE IN THE COMBINATION MODE

Velocity Effects

Velocity (in synthesizer and MIDI terminology) is a measure of how quickly you strike a note on a MIDI keyboard, how hard you pick a string on a MIDI guitar, or how much breath you use at the start of a note on a MIDI wind controller. However you exert it, velocity is one of the most expressive devices available to a performer. VZ synthesizers have velocity-related features, making them among the most expressive of MIDI performance instruments. Here are the basic velocity effects that you can create with VZ synthesizers

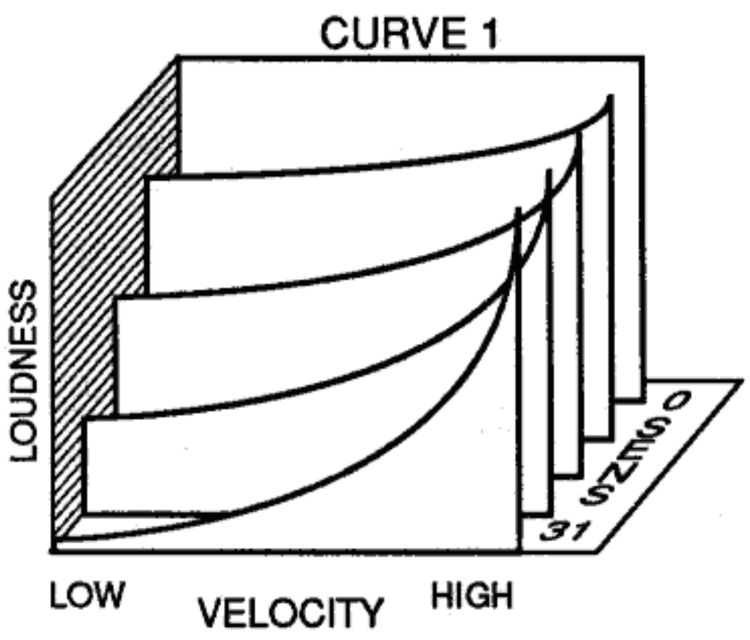
- Velocity dynamics: Playing with different velocities changes the loudness or timbre of a sound.(It is possible to customize the VZ's response to velocity dynamics.)
- Velocity switching: Playing with different velocities switches between totally different sounds.
- Velocity cross-fades: Playing with different velocities changes the relative balance between two totally different sounds.
- Velocity controlled envelopes: Playing with different velocities scales the rates and levels of amplitude and pitch envelopes of a sound.

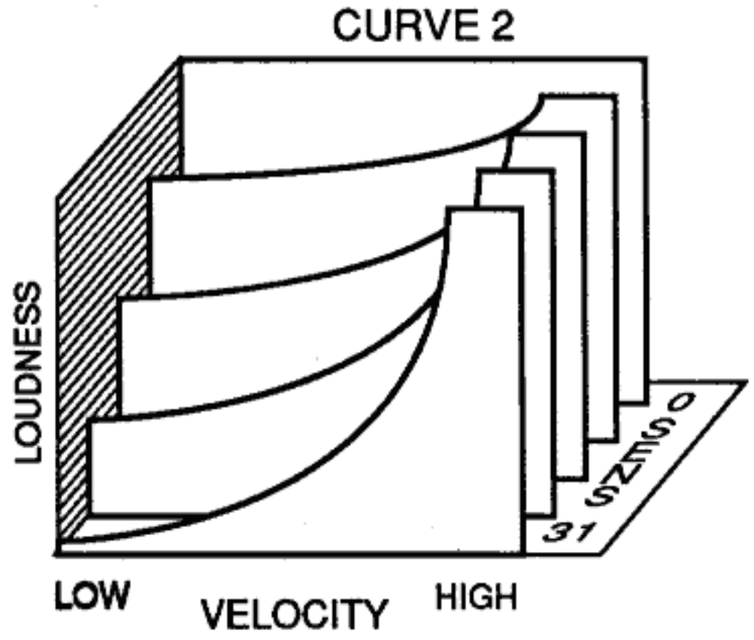
Note: It is also possible to combine these basic velocity effects with techniques that are based on module levels, like envelope pan, chords from single voices, and envelope-based echo and reverb to produce even more velocity controlled effects.

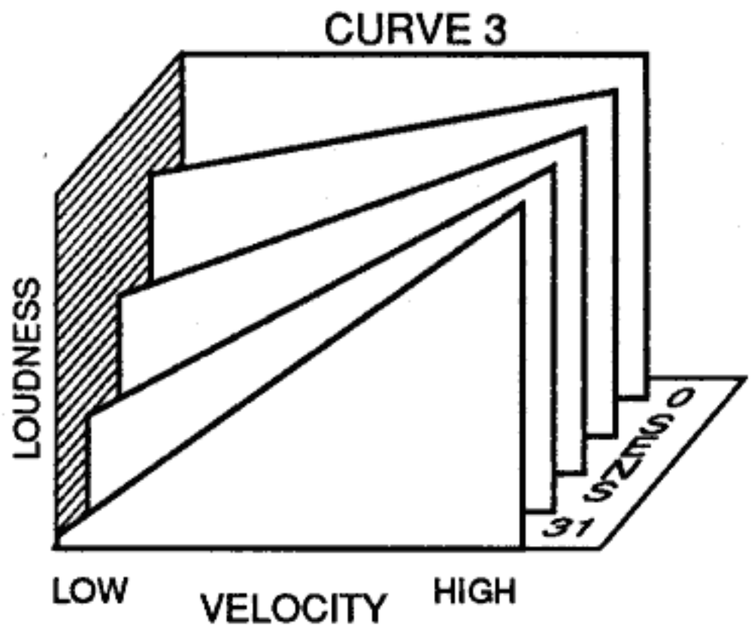
About Velocity Curves and Sensitivity

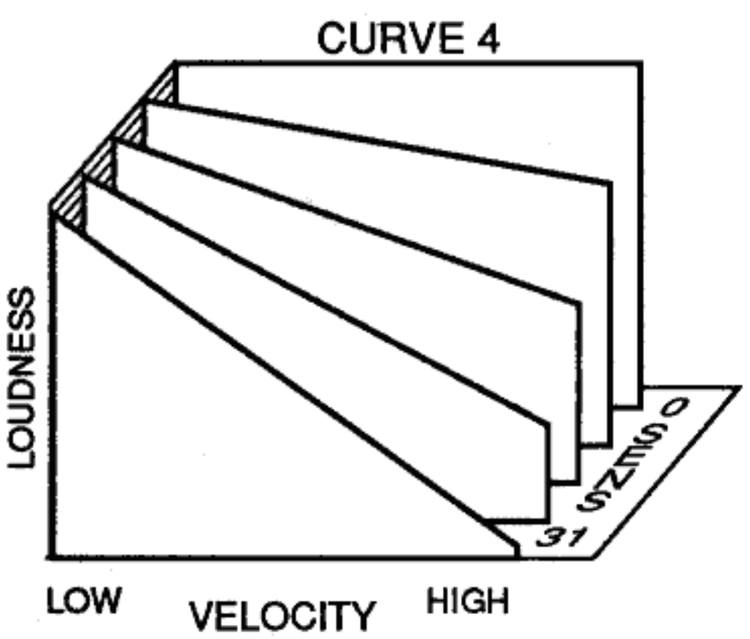
VZ synthesizers offer a variety of curves for their velocity functions. Each curve responds differently to velocity changes. The different curves make it possible to produce switching and cross-fade effects. They also allow you customize the response of any velocity effect to match your own playing style. You can, for example, change a preset sound to be more or less sensitive to your dynamics. Keep the following guidelines in mind:

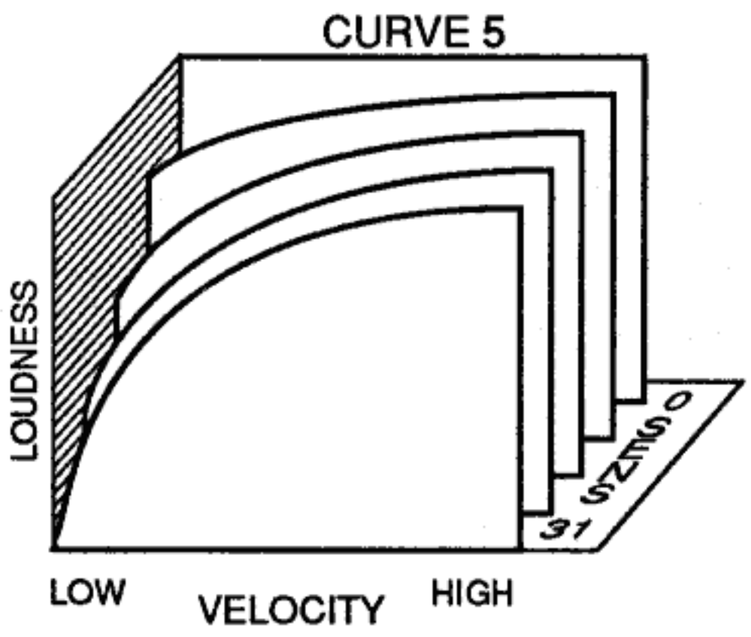
- The sensitivity value determines the overall range of dynamics. The higher this value, the greater the change between minimum and maximum dynamics.
- The curve value determines how velocity changes will be scaled. The illustration on the following page shows the scaling for each of the curves.
- There are eight sets of VEL LEVEL parameters — one for each iPD module in a voice. As you adjust VEL LEVEL parameters, listen only to the affected module(s). This will allow you to hear your adjustments clearly.

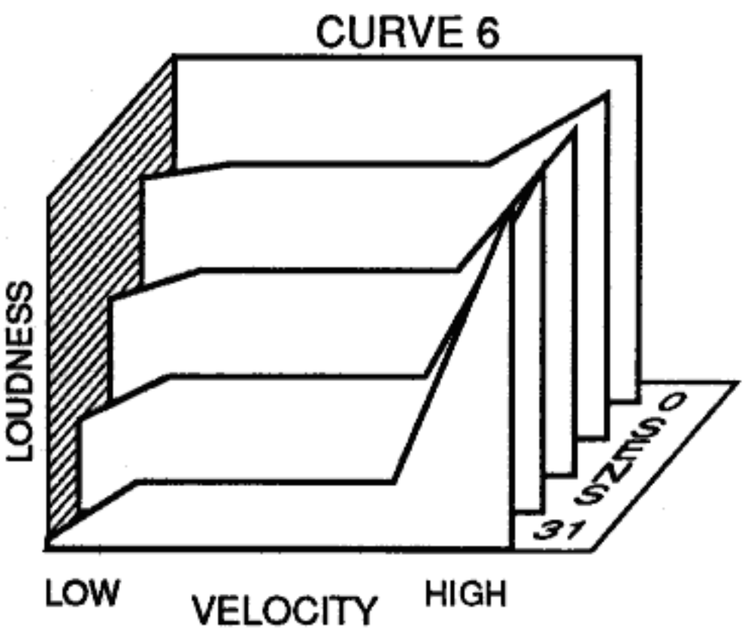


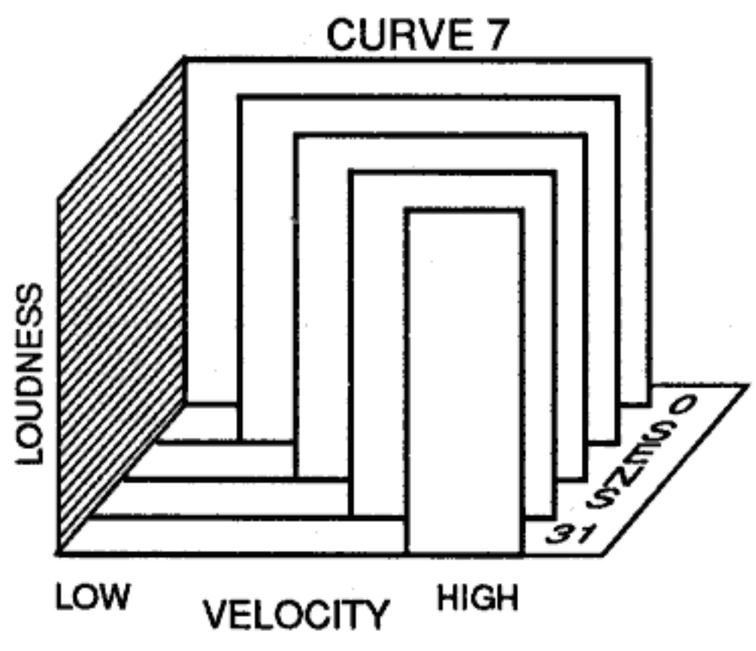


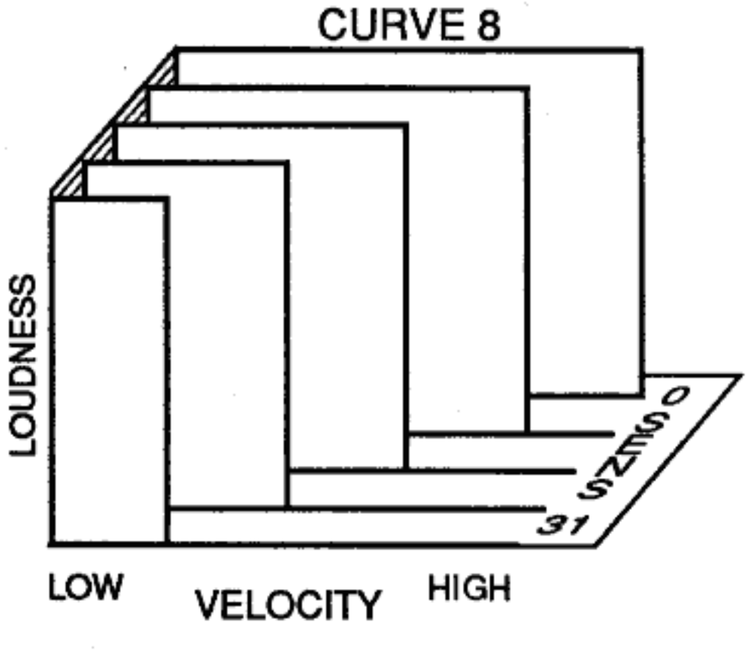






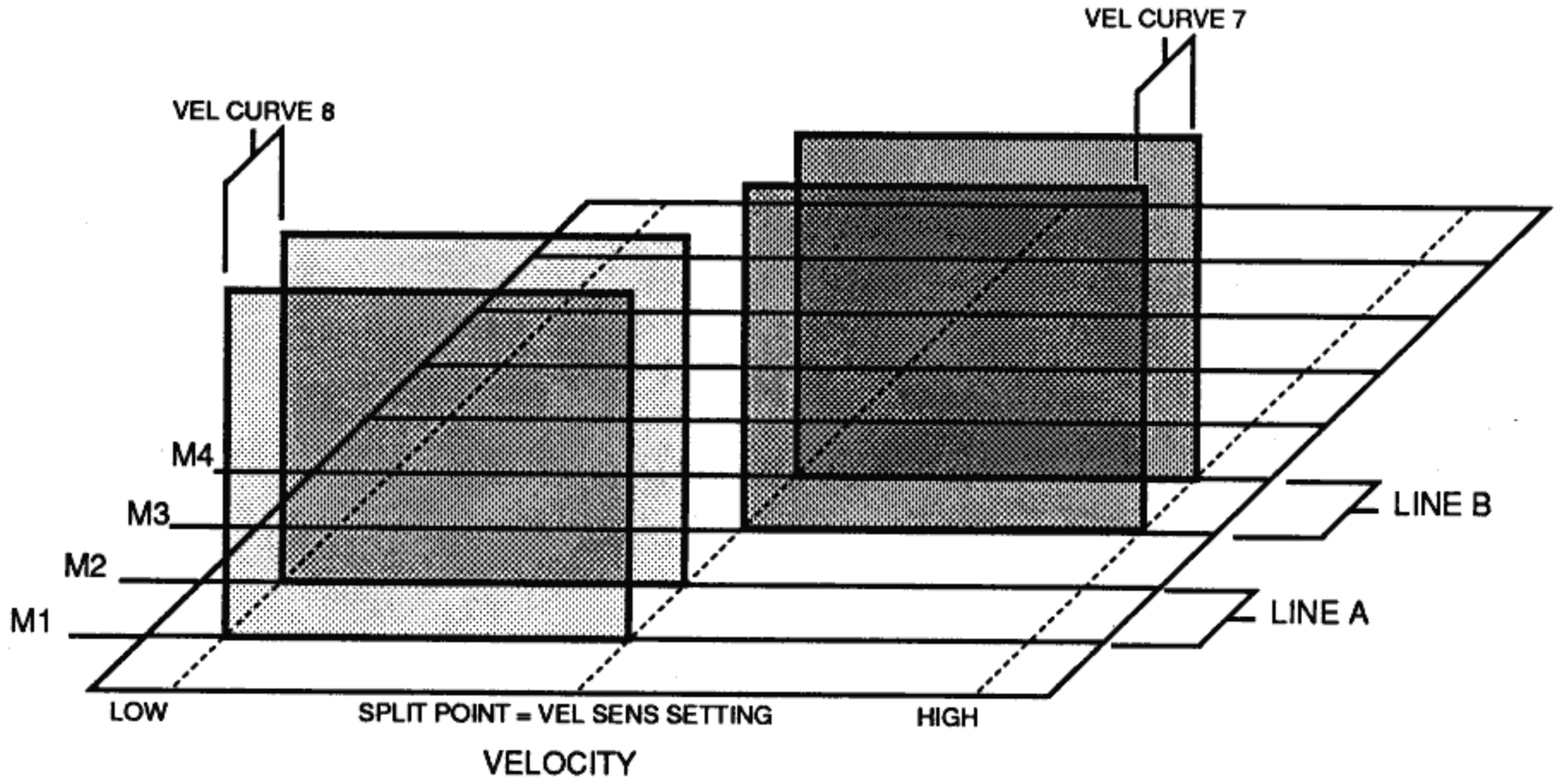






VZ Velocity Curves

Single Voice Velocity Switch



NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	ON	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE				
INT LINE	M1 M2	M3 M4	M5 M6	M7 M8
	MIX	RING	–	–

WAVEFORM							
M1	M2	M3	M4	M5	M6	M7	M8
SAW 1	–	SINE	–	–	–	–	–

DETUNE					
FIX	HARMONIC	POLARITY	OCT	NOTE	FINE
M1 OFF	1	+	0	7	0
M3 OFF	1	-	0	0	0

VEL LEVEL		
	M1	M3
SENS	10	10
CURVE	7	8

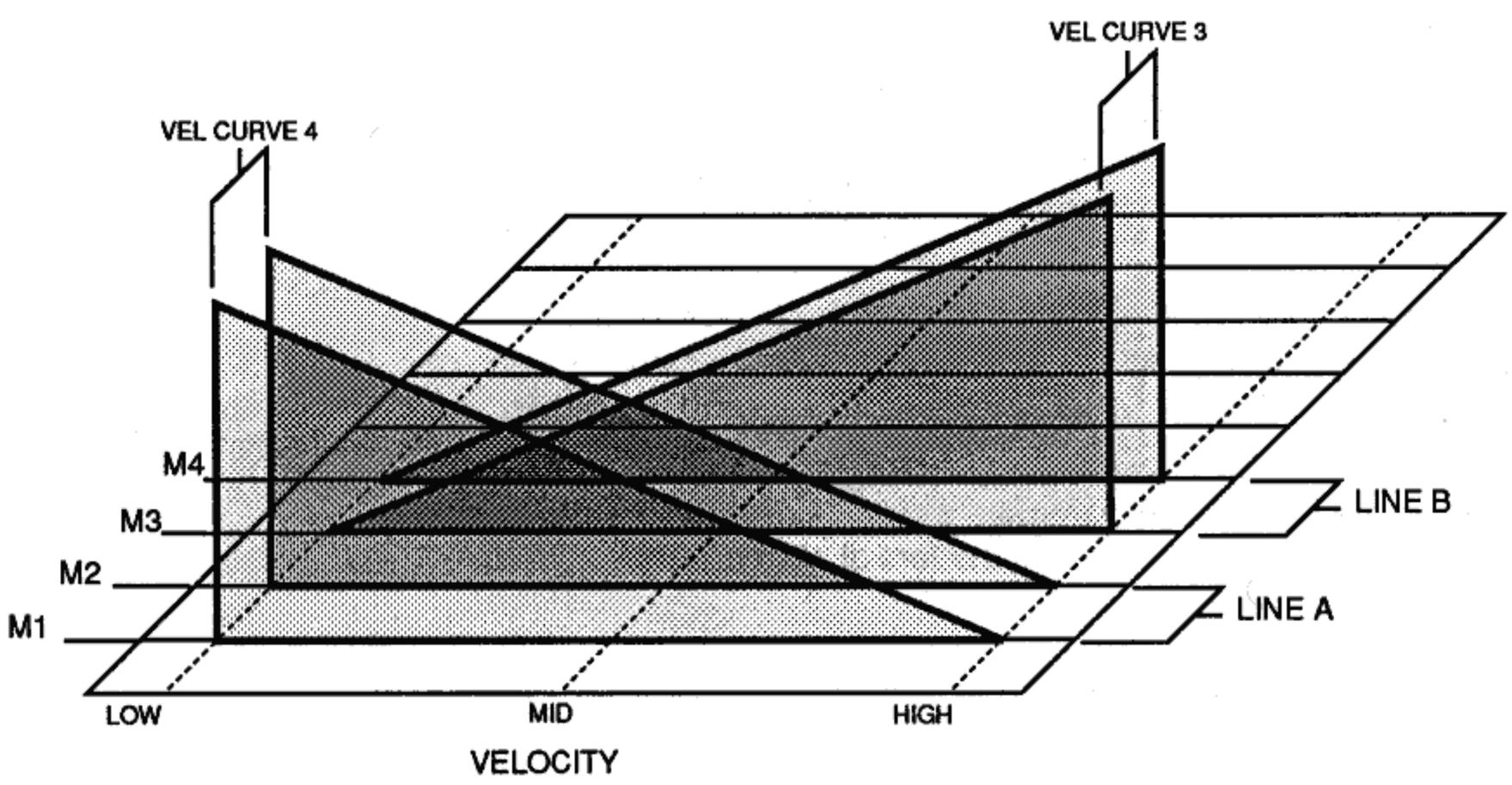
Curves 7 and 8 can be used to switch modules on or off with velocity. When using these curves, the sensitivity value becomes a "threshold" value. Velocities above the threshold will turn a module on (curve 7) or off (curve 8). You can easily set up voices that velocity switch between two or more sets of modules. Here's how to set up a simple single voice switch:

1. Make copy of "INIT VOICE" to use for this experiment.
2. Turn M1 and M3 on, using the module On/Off buttons.
3. Set the DETUNE and VEL LEVEL parameters as shown. This will produce a voice that switches between M1 (higher velocities) and M3 (lower velocities).
4. Experiment with different sensitivity values to find one that fits your touch. To create a switch, the value must be the same for both M1 and M3.

You can apply this technique to any single voice that consists of two sounds. Set the VEL LEVEL parameters of all modules that make up one sound to the M1 values; set the parameters of all modules that make up the other sound to the M3 parameters.

Note: Velocity switching allows you to add or subtract up to eight modules to or from a single voice. This means that *any effect* based on the levels of modules can be switched on and off with velocity.

Single Voice Velocity Cross-Fades



NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	OFF	ON	OFF	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

	LINE			
INT LINE	M1 M2	M3 M4	M5 M6	M7 M8
	MIX	RING	–	–

WAVEFORM							
M1	M2	M3	M4	M5	M6	M7	M8
SAW 1	–	SINE	–	–	–	–	–

DETUNE						
	FIX	HARMONIC	POLARITY	OCT	NOTE	FINE
M1	OFF	1	+	0	7	0
M3	OFF	1	-	0	0	0

VEL LEVEL		
	M1	M3
SENS	31	31
CURVE	3	4

Curves 3 and 4 can be used to set up a velocity cross-fade between pairs of modules in a single voice. Setting up a single voice cross-fade is very similar to setting up a velocity switch:

1. Make copy of "INIT VOICE" to use for this experiment.
2. Turn on M1 and M3 on, using the module On/Off buttons.
3. Set the DETUNE and VEL LEVEL parameters as shown. This will produce a voice that cross-fades between M1 (higher velocities) and M3 (lower velocities).
4. Experiment with different sensitivity values to find one that fits your touch.

NORMAL MODE

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	ON	OFF	ON	OFF	OFF	OFF	OFF

VOICE PARAMETER MENU

LINE				
	M1 M2	M3 M4	M5 M6	M7 M8
INT LINE	MIX	PHASE	–	–
EXT PHASE		ON	–	–

WAVEFORM							
M1	M2	M3	M4	M5	M6	M7	M8
SAW3	SAW3	SINE	–	–	–	–	–

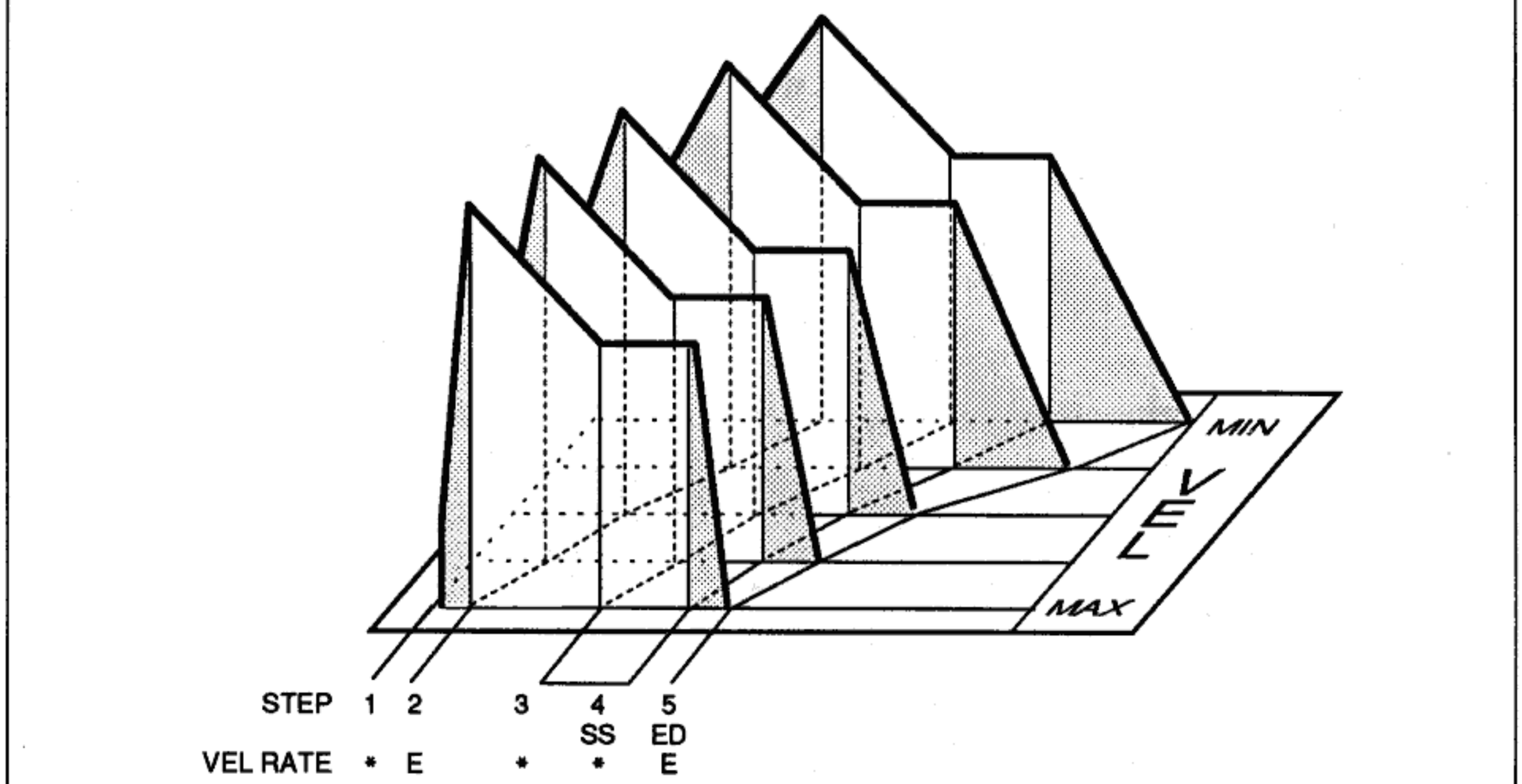
DETUNE						
	FIX	HARMONIC	POLARITY	OCT	NOTE	FINE
M1	OFF	2	+	1	7	0
M3	OFF	4	-	2	2	0

VEL LEVEL		
	M1	M3
SENS	31	31
CURVE	4	3

Velocity cross-fades allow you to alter the balance of pairs of modules. This means that *any effect* based on the relative levels of modules can controlled with velocity. Here's an example of how to set up a cross-fade between two modules used as external phase modulators.

1. Make copy of "INIT VOICE" to use for this experiment.
2. Turn on M1,M2 and M3 on, using the module On/Off buttons.
3. Set the LINE, DETUNE and VEL LEVEL parameters as shown. This will produce a cross-fade between M2 (higher velocities) and M1 (lower velocities). These two modules are controlling the *timbre* of line B via external phase modulation.
4. Play notes and chords with different velocities. You will hear M2 controlling timbre at high velocities, and M1 controlling timbre at low velocities. At moderate velocities you will hear a mixture of M1 and M2 controlling timbre.

Velocity Control of Envelope Rates



The VEL RATE function allows you to control the rates of either the pitch or amplitude envelopes of a voice. The settings of this function are global — all modules in the voice are affected. You can, however, choose to control only the pitch EG, only the amplitude EG, or both. For each envelope, you can select the steps that will change rate with velocity. Keep the following guidelines in mind when you use the VEL RATE function.

- Rates controlled by this function will always become quicker than rates programmed in the original envelope settings.
- Adjust the envelope rate settings to produce the slowest changes you want to hear.
- After setting up the envelopes, adjust the VEL RATE sensitivity to produce the quickest changes you want to hear when playing with maximum velocity.

Here are three experiments to demonstrate some of the effects you can produce with the VEL RATE function.

Velocity Controlled Attack and Release

NORMAL MODE

(TRY THIS WITH VOICE B-8: SLOPHASESTR)

MODULE ON/OFF							
M1 ON	M2 ON	M3 OFF	M4 ON	M5 OFF	M6 OFF	M7 OFF	M8 OFF

VOICE PARAMETER MENU

VEL RATE :AMP ENV								
STEP	1	2	3	4	5	6	7	8
M1 E✱	E	✱	✱	E	–	–	–	–
M2 E✱	E	✱	✱	E	–	–	–	–
M3 E✱	E	✱	E	–	–	–	–	–
M4 E✱	E	✱	E	–	–	–	–	–
M5 E✱	E	✱	✱	E	–	–	–	–
M6 E✱	E	✱	✱	E	–	–	–	–
M7 E✱	E	✱	E	–	–	–	–	–
M8 E✱	E	✱	✱	E	–	–	–	–

VEL RATE	
SENS	15
CURVE	1

Here's an example of how to edit a voice so that its attack and release rates are velocity controlled.

1. Select a voice with a fairly slow attack and release. For example, use B-8 "SLOPHASESTR" (Card 2: VZ-1 / VZ-10M, Preset 2: VZ-8M).
2. Enter VEL RATE and enable and adjust the first and last steps of each envelope as shown.
3. Set the sensitivity and curve values as shown.
4. Play notes and chords with different velocities. The quicker you strike the keys, the quicker the attack and release of the voice.
5. Play and listen to this voice with different curve and sensitivity settings.

Velocity Controlled Echoes

NORMAL MODE

(TRY THIS WITH VOICE A-7: HEAVY CLAVI)

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	ON	OFF	ON	ON	ON	OFF	ON

VOICE PARAMETER MENU

AMP ENV: M4								
STEP	1	2	3	4	5	6	7	8
RATE	99	30	99	30	99	30	99	30
LEVEL	99	0	99	0	99	0	99	0
SS/ED	–	–	–	–	–	–	–	ED
E/✳	✳	E	✳	E	✳	E	✳	E

VEL RATE	
SENS	20
CURVE	1

AMP ENV: M8								
STEP	1	2	3	4	5	6	7	8
RATE	99	30	99	30	99	30	99	30
LEVEL	99	0	99	0	99	0	99	0
SS/ED	–	–	–	–	–	–	–	ED
E/✳	✳	E	✳	E	✳	E	✳	E

This example adds velocity control to the amp envelope echo effect demonstrated in *Echo Effects*. The repeat rate of the echoes in this voice will change with velocity. Slow velocities will produce slow repeat rates; fast velocities will produce fast repeat rates.

1. Select any voice and find the loudness modules.
2. Reset the DCA envelope for one of the loudness modules to produce repeated attacks and decays. Use the settings shown here as a guideline.
3. Use the COPY function to copy the envelope settings to the other loudness modules in the voice.
4. Enter VEL RATE and enable and adjust the decay steps of each envelope as shown.
5. Set the sensitivity and curve values as shown.
6. Play notes and chords with different velocities. The quicker you strike the keys, the quicker the echo repeat rate.
7. Play and listen to this voice with different curve and sensitivity settings.

Velocity Controlled Pitch Bend

NORMAL MODE

(TRY THIS WITH VOICE A-7: HEAVY CLAVI)

MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	ON	OFF	ON	ON	ON	OFF	ON

VOICE PARAMETER MENU

PITCH ENV								
STEP	1	2	3	4	5	6	7	8
RATE	15	50	–	–	–	–	–	–
LEVEL	-8	0	–	–	–	–	–	–
SS/ED	SS	ED	–	–	–	–	–	–
E✳	E	✳	–	–	–	–	–	–

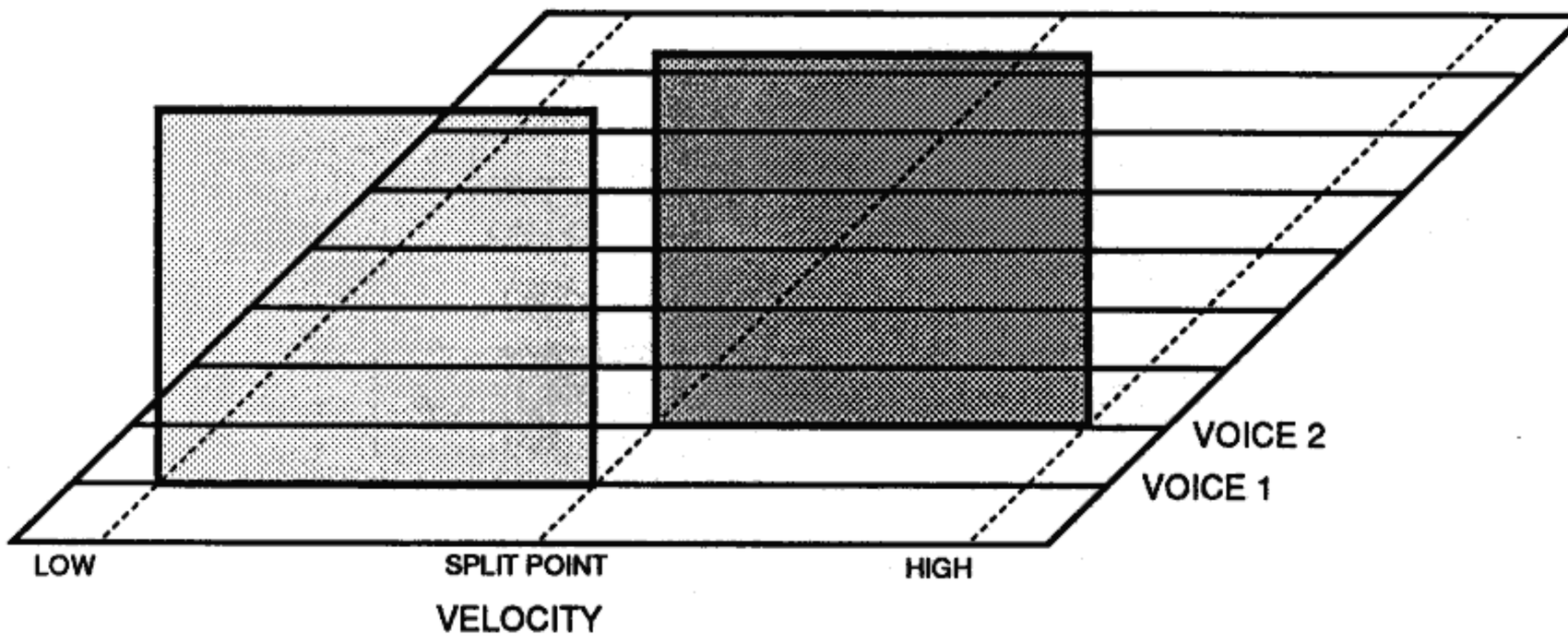
P ENV DEPTH	
DEPTH	NARROW
RANGE	63

VEL RATE	
SENS	14
CURVE	8

In the previous two examples we used velocity to scale the rates of envelopes. You can also use velocity to switch between rates. In this example we use the pitch envelope to create a guitar-like pitch bend. We use VEL RATE to switch between a very slow and a very quick bend.

1. Select "DISTORTAR", or any other guitar-like voice.
2. Enter PITCH ENV and set the values as shown.
3. Enter VEL RATE and set the values as shown.
4. Play notes and chords with different velocities. On notes with very quick velocities, you will hear a slow pitch bend. On notes with moderate and slow velocities you will hear no pitch bend at all.
5. Play and listen to this voice with different curve and sensitivity settings.

Combination Mode Velocity Switch



COMBINATION MODE	KEY ASSIGN
	1 + 2

VOICE ASSIGMENT (VZ-1, VZ-10M & VZ-8M)					
1	NO.	H1	2	NO.	B-2
	NAME	VZ VIBES		NAME	BRASSECTION

EFFECT MENU

VEL SPLIT		
RANGE (FROM)	0	63
RANGE (T0)	64	127

A velocity switch changes voices according to how quickly you push down a key (or how hard you strike a guitar string, or blow into a breath controller.) A velocity switch is set up using the VEL SPLIT function:

1. Select a key assign configuration with a stereo layer, like "1+2"or "3+4".
2. Assign a different voice to each layer.
3. Set the VEL SPLIT range for each voice in the layer as shown.
4. Play notes and chords with different velocities. Lower velocities will play voice 1; higher velocities will play voice 2.
5. Experiment with different ranges for each voice. Use ranges that don't overlap to switch between voices. Use overlapping ranges to add additional voices with velocity.

Echo Effects

VZ synthesizers offer several options for simulating echo effects:

- The eight-step envelope generators can be programmed to create repeating attacks (echo).
- A "SAW DOWN" tremolo with multi "on" can create repeating echoes.
- The delay trigger function can be used to create slap echoes, and initial decay ambience effects.

AMP ENV-based Echo

To create echo effects with the AMP ENV function, program the loudness envelopes of an iPD voice with shapes that have multiple attacks. (See illustration.) The placement of the sustain step, and the way you play notes can produce a number variations to amp envelope echo effects. Be sure to try the amp envelope experiment in Part 2.

Note: You can use the VEL RATE or KF RATE functions to control the echo decay rate, as well as the timing between echoes with velocity or key position.

1. Select any voice and find the loudness modules.
2. Reset the DCA envelope for one of the loudness modules to produce repeated attacks and decays. Use the settings shown here as a guideline.
3. Use the COPY function to copy the envelope settings to the other loudness modules in the voice.

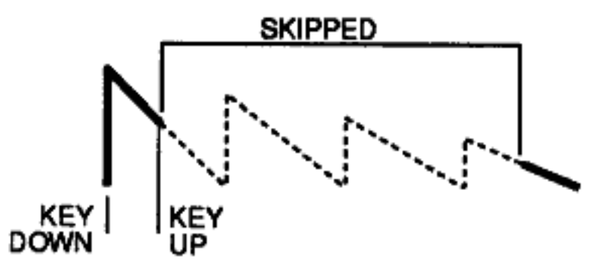
WITH SUSTAIN STEP

STEP	1	2	3	4	5	6	7	8
RATE	99	50	99	50	99	50	99	50
LEVEL	99	00	90	00	85	00	80	00
SS / ED	SS	-	-	-	-	-	-	ED

Multi-Attack Envelope with Sustain

WITHOUT SUSTAIN STEP

STEP	1	2	3	4	5	6	7	8
RATE	99	50	99	50	99	50	99	50
LEVEL	99	00	90	00	85	00	80	00
SS / ED	-	-	-	-	-	-	-	ED



Multi-Attack Envelope without Sustain

NORMAL MODE

(TRY THIS WITH VOICE A-7: HEAVY CLAVI)

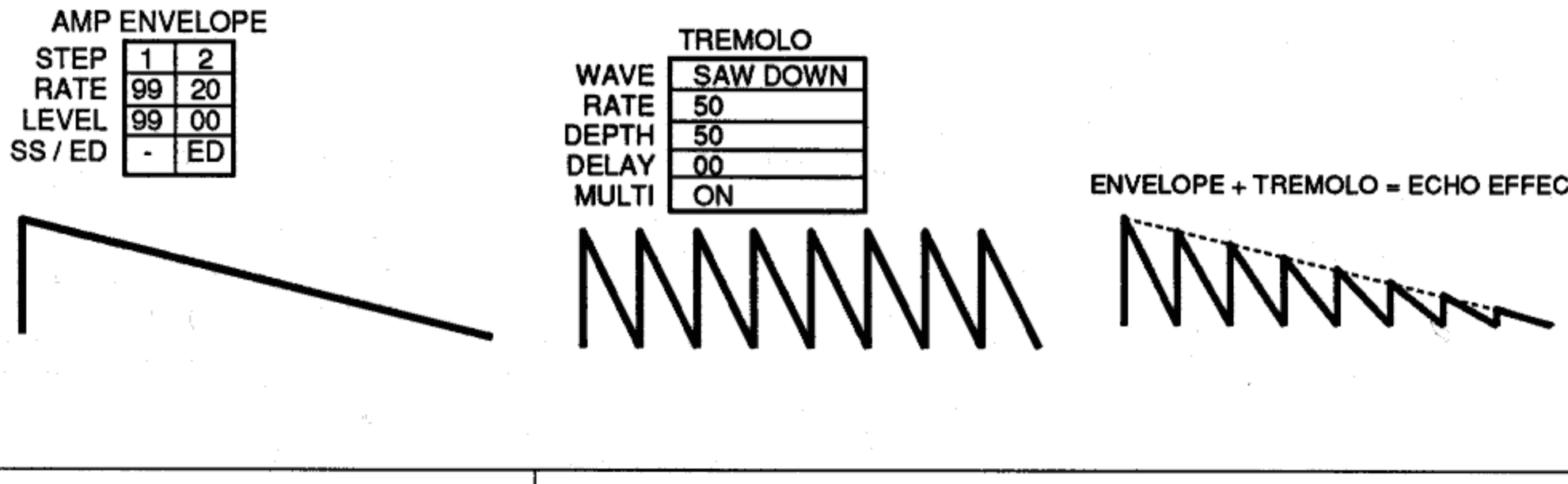
MODULE ON/OFF							
M1	M2	M3	M4	M5	M6	M7	M8
ON	ON	OFF	ON	ON	ON	OFF	ON

VOICE PARAMETER MENU

AMP ENV: M4								
STEP	1	2	3	4	5	6	7	8
RATE	99	30	99	30	99	30	99	30
LEVEL	99	0	90	0	80	0	70	0
SS/ED	–	–	–	–	–	–	–	ED

AMP ENV: M8								
STEP	1	2	3	4	5	6	7	8
RATE	99	30	99	30	99	30	99	30
LEVEL	99	0	90	0	80	0	70	0
SS/ED	–	–	–	–	–	–	–	ED

Tremolo-based echo



To create echo effects with the TREMOLO function, add "SAW DOWN" tremolo to all of the modules in any iPD voice, and set the multi value to "on". Be sure to experiment with the other tremolo parameters: depth, rate, and delay. (See *Tremolo*, page 54.) Here is a basic procedure to add tremolo-based echo to any VZ voice.

1. Select any voice.
2. Set the AMP SENS value for all modules to "7".
3. Set the TREMOLO wave to "SAW DOWN". This produces a "normal" echo effect. Use "SAW UP" to create "backwards" echo effects.
4. Set MULTI to "on".
5. For echo that is "on" all the time, set the TREMOLO depth value between "10" and "99". Otherwise, set this value to "0", and set a controller for TREMOLO depth. (See *Tremolo Rate and Depth.*)
6. Set the echo repeat rate with the TREMOLO rate value — higher numbers produce faster repeats. You can also control the rate of the echo with a controller.
7. To create a delayed echo effect set the TREMOLO delay value to a number greater than "0". The higher the number, the longer the delay before the echo fades in.
8. If the sound's envelopes have sustain segments, the sustain pedal will act as an "echo hold" switch.

When you're ready to save the sound, remember that the effects menu settings aren't saved with the voice parameters. If you want to save the effects settings, first save the voice in the normal mode, then save the entire normal mode work area by saving to an operation memory.

NORMAL MODE

(VZ-1 & VZ-10M USE A2: WARM PIANO)
(VZ-8M USE A1: WARM PIANO)

VOICE PARAMETER MENU

TREMOLO				
WAVE	DEPTH	RATE	DELAY	MULTI
SAW DOWN	50	50	0	ON

AMP SENS							
M1	M2	M3	M4	M5	M6	M7	M8
7	7	7	7	7	7	7	7

EFFECT MENU

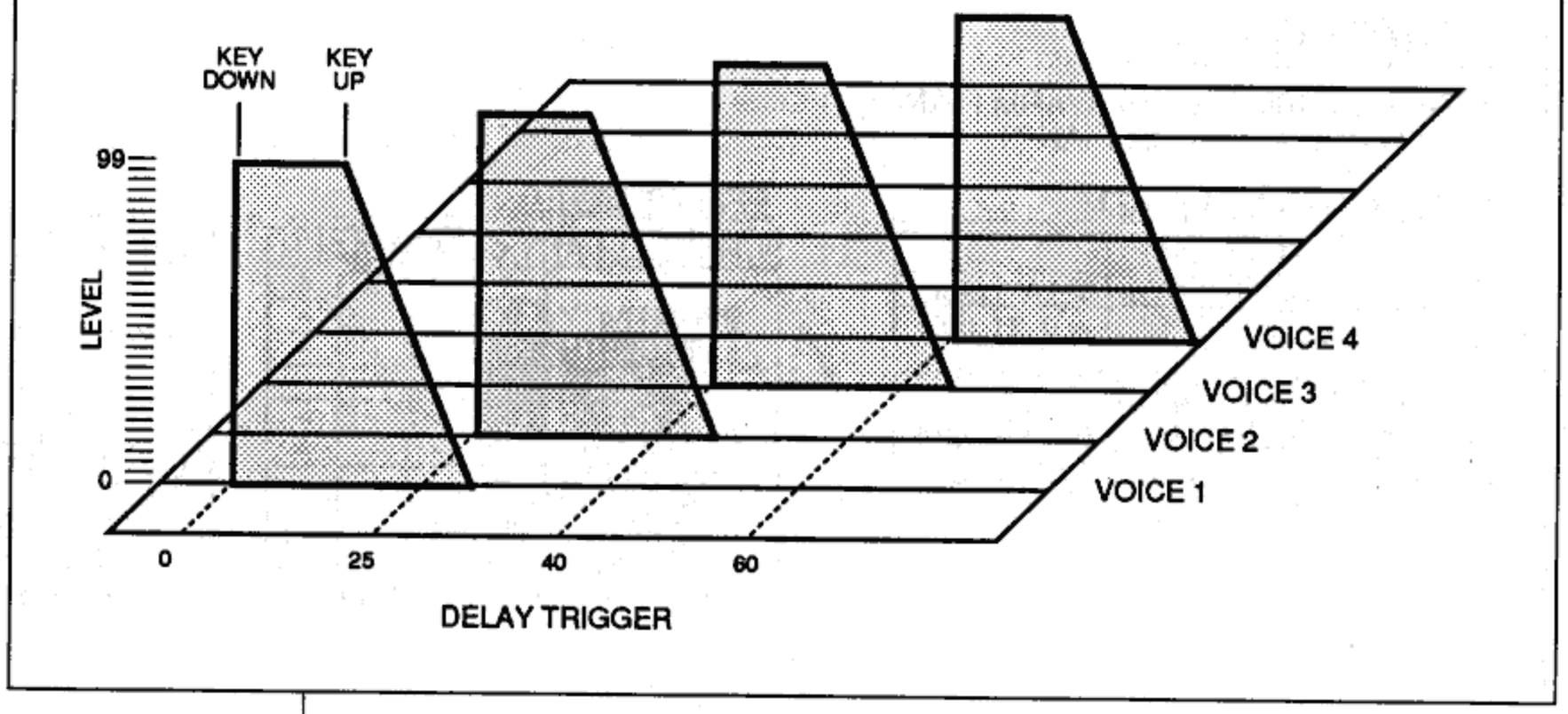
WHEEL OR ANY CONTROLLER				
	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	ON	–	–	–
TREM RATE	OFF	–	–	–
A ENV BIAS	OFF	–	–	–

CONTROL OF ECHO LEVEL

WHEEL OR ANY CONTROLLER				
	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	OFF	–	–	–
TREM RATE	ON	–	–	–
A ENV BIAS	OFF	–	–	–

CONTROL OF ECHO RATE

Combination Delay Echo



You can add slap echoes and ambience effects by layering the same voice two or more times in the Combination mode, and using the DELAY TRIGGER function to delay the attack of each note. Longer delay times will produce slap echoes; shorter delay times will produce ambience (initial decay) effects.

Note: You can enhance ambience effects by using pitch function of the effects menu to add a slight detune to each layer.

1. Select a layered key assign configuration , like "1+2", "3+4", or "1+2+3+4".
2. Assign the same voice to each layer. This effect works well with any kind of voice. Be sure to try it with percussive sounds (piano, guitar, etc.) as well as sustaining sounds (strings, brass, etc.)
3. Set a DELAY TRIGGER value for all but one layer. Values between "1" and "20" will produce ambience effects; higher values will create echoes.
4. To simulate echo each repeat should be slightly softer in volume. Use the COMBI LEVEL function to lower the level of the delayed layers.

COMBINATION MODE

KEY ASSIGN
1 + 2 + 3 + 4

VOICE ASSIGMENT (VZ-1, VZ-10M & VZ-8M)											
1	NO.	A-7	2	NO.	A-7	3	NO.	A-7	4	NO.	A-7
	NAME	HEAVY CLAVI		NAME	HEAVY CLAVI		NAME	HEAVY CLAVI		NAME	HEAVY CLAVI

EFFECT MENU

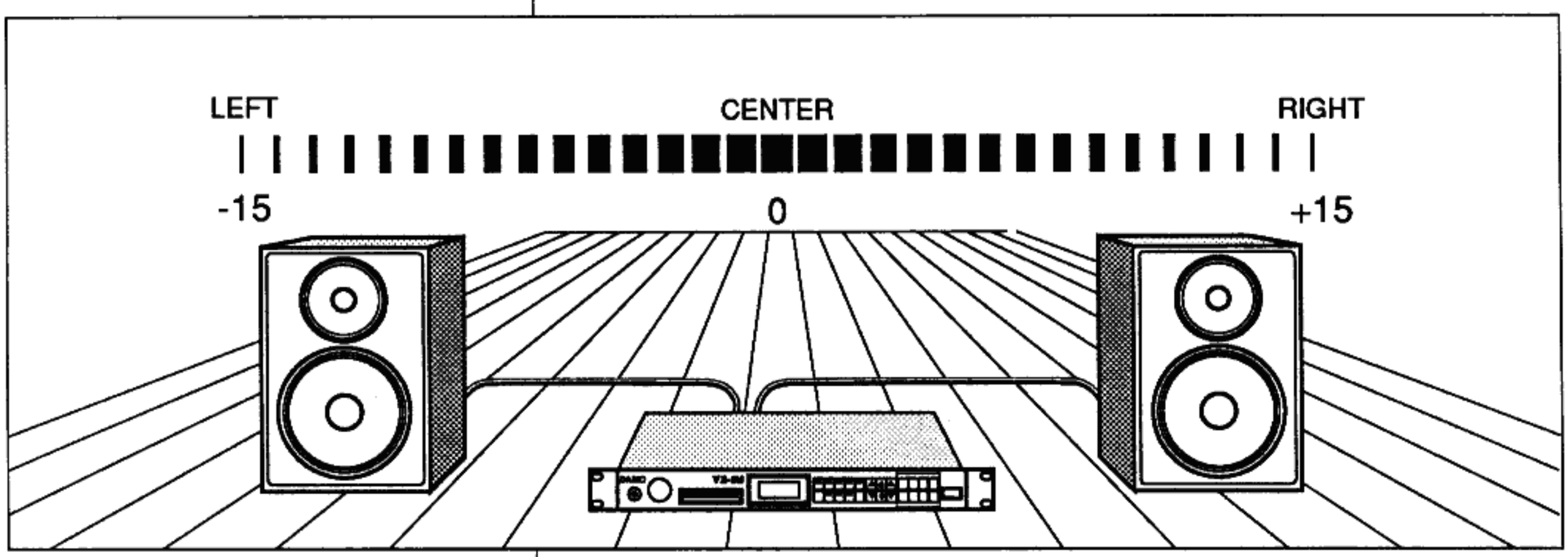
DELAY TRIG				
	1	2	3	4
DELAY	0	40	49	54

COMBI LEVEL				
	1	2	3	4
LEVEL	99	90	85	80

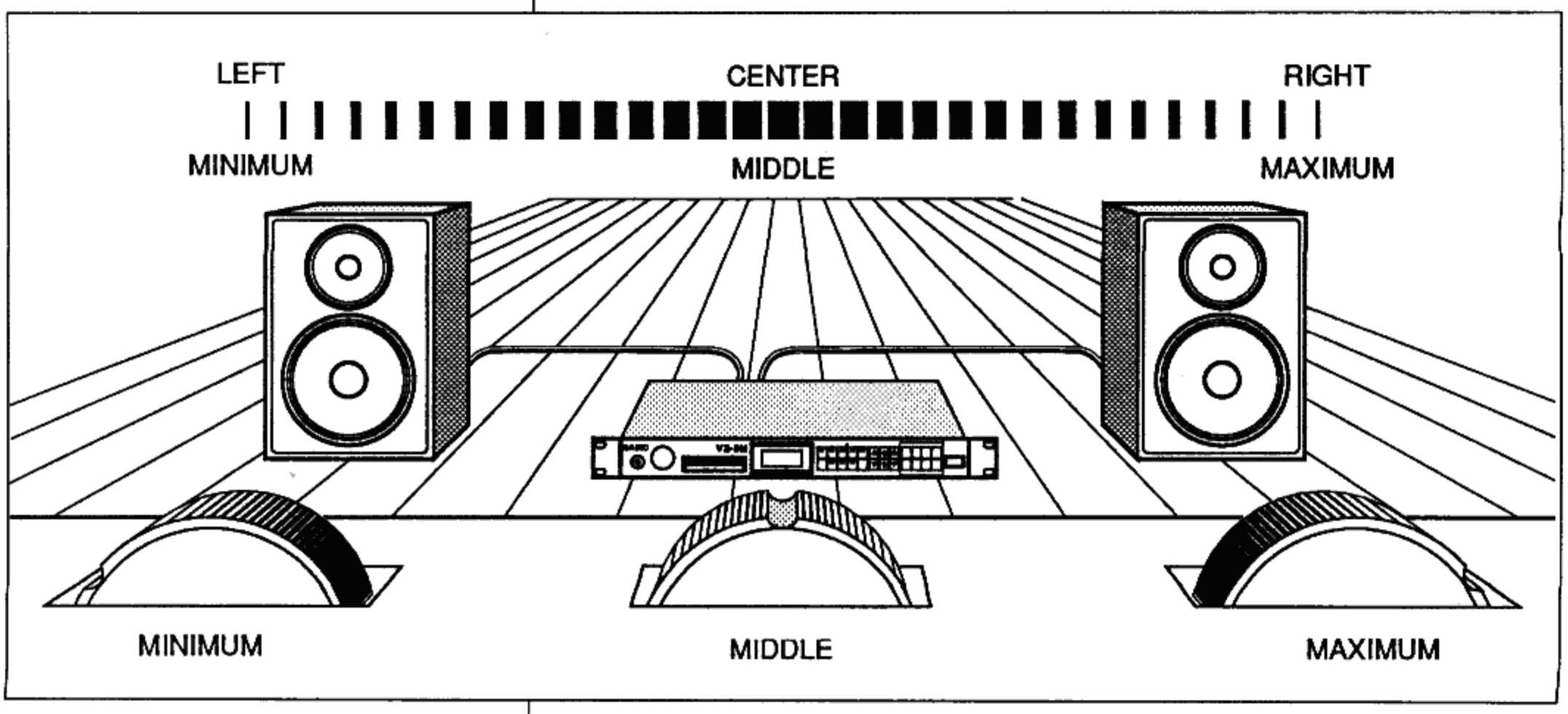
Stereo Effects

There are several ways to produce dramatic stereo effects with VZ synthesizers. The VZ-8M has a unique PAN function with three different stereo effects. It is also possible to create several other stereo effects by taking advantage of features of the combination mode. Combination mode stereo effects can be created on the VZ-1, VZ-10M, and VZ-8M. In order to hear stereo effects, each audio output must be connected to a separate channel of a stereo mixer. For example, connect output 1 to the left channel and output 2 to the right channel. (You can also hear stereo effects by listening to stereo headphones connected to the headphone jack.)

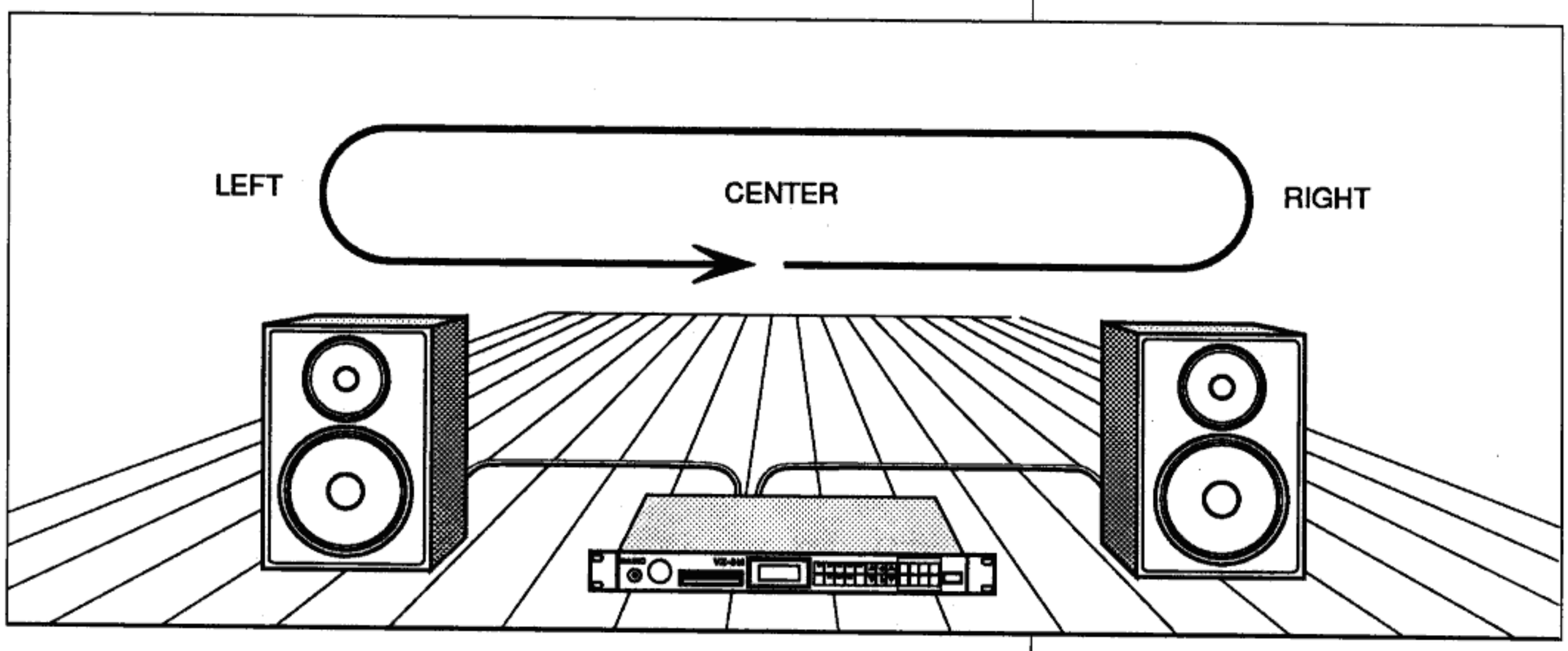
About VZ-8 M Pan Modes



Fix Mode Pan



Controller Mode Pan

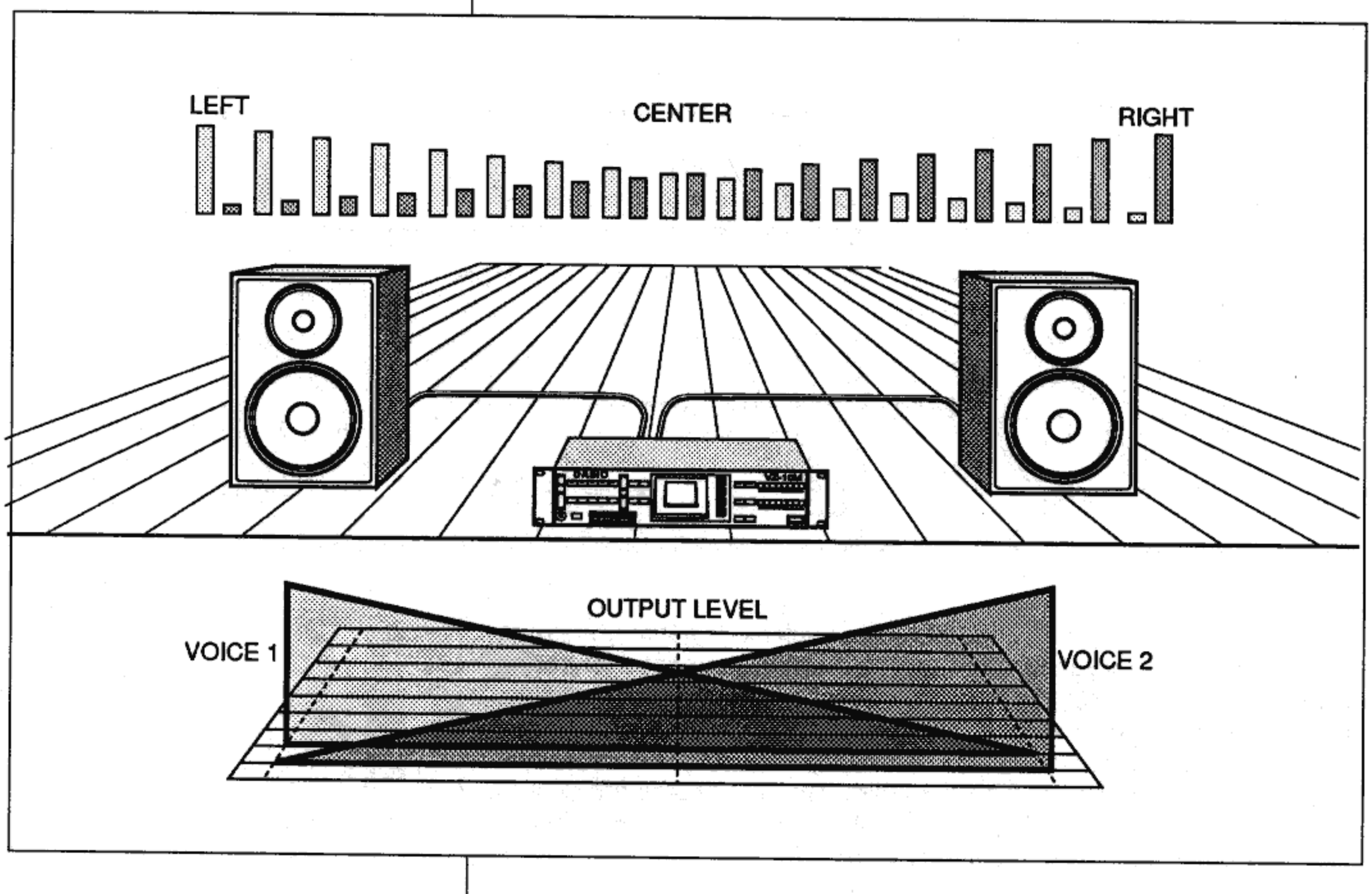


Auto Mode Pan

The PAN function has three distinct modes. Each mode allows you to pan (move between the left and right of the stereo mix) VZ sounds by controlling two "panpots." In the combination, multi channel, and guitar performance modes, panpot 1 pans sounds normally routed to output 1; panpot 2 pans sounds normally routed to output 2. In the normal mode, the sound is sent alternately to each panpot. The first, third, fifth (etc.) notes are sent to panpot 1, and the second, fourth, sixth (etc.) notes are sent to panpot 2. Here is a brief summary of the three modes.

- Fix: This mode is similar to a conventional, two-channel, stereo mixer. The output of each panpot can be independently panned to a fixed position anywhere between left (-15), center (0), and right (+15). Note: In the normal mode, set both panpots to the same value to move the sound to a fixed position in the stereo mix.
- Control: This mode allows you to independently pan the output of each panpot with a controller of your choice. You may control each panpot with the same controller, or you may use a different one for each. Six different panning ranges allow you to create a number of different panning motions.
- Auto: This mode allows you to independently pan the output of each panpot with an LFO. The speed and rate of the panning effect are variable, but apply equally to both panpots. You can also specify a controller to change the panning depth.

About Combination Mode Stereo Effects



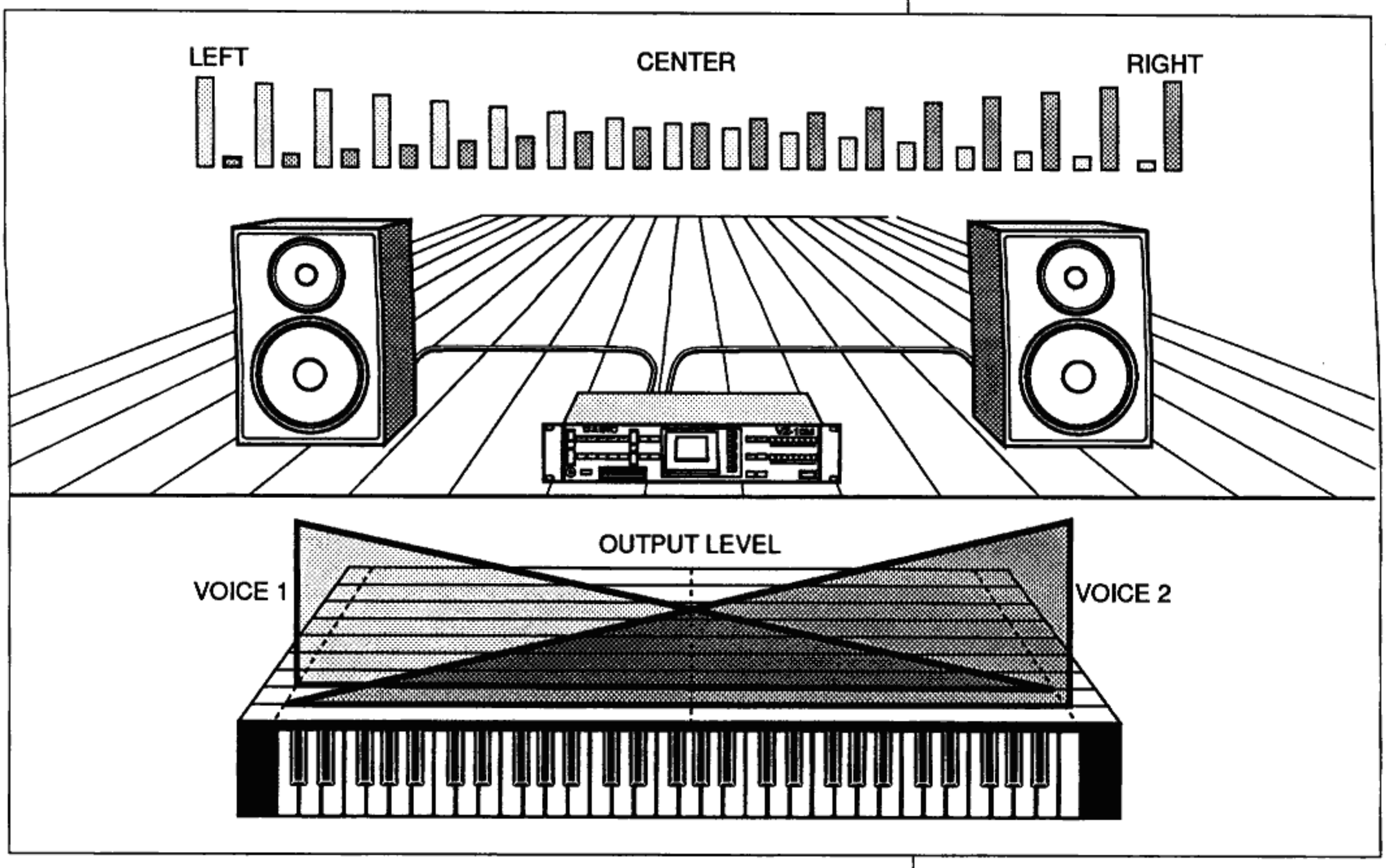
There are many stereo effects that can be created in the Combination mode. They are all variations of the following basic technique.

1. Select a key assign configuration with a stereo layer, like "1+2"or "3+4".
2. Assign the same voice to each side of the layer.
3. Control the level of the two voices so that as one gets louder the other gets softer.

That's all there is to it. If both voices are the same level, the sound will be in the center of the stereo mix. If the left voice grows louder as the right voice grows softer, the sound will move towards the left side of the stereo mix. If the right voice grows louder as the left voice grows softer, the sound will move towards the right side of the stereo mix. There are several ways to control the levels of VZs in this manner. Each one produces a different type of panning effect.

Note: To get the best results with these effects on a VZ-8M: set the pan mode to "fix", set panpot 1 to "-15" and panpot 2 to "+15".

Positional Pan



COMBINATION MODE

KEY ASSIGN
1+2

VOICE ASSIGMENT (VZ-1, VZ-10M & VZ-8M)					
1	NO.	C-1	2	NO.	C-1
	NAME	VZ TRUMPET		NAME	VZ TRUMPET

ASSIGN THE SAME VOICE
TO BOTH SIDES OF THE LAYER

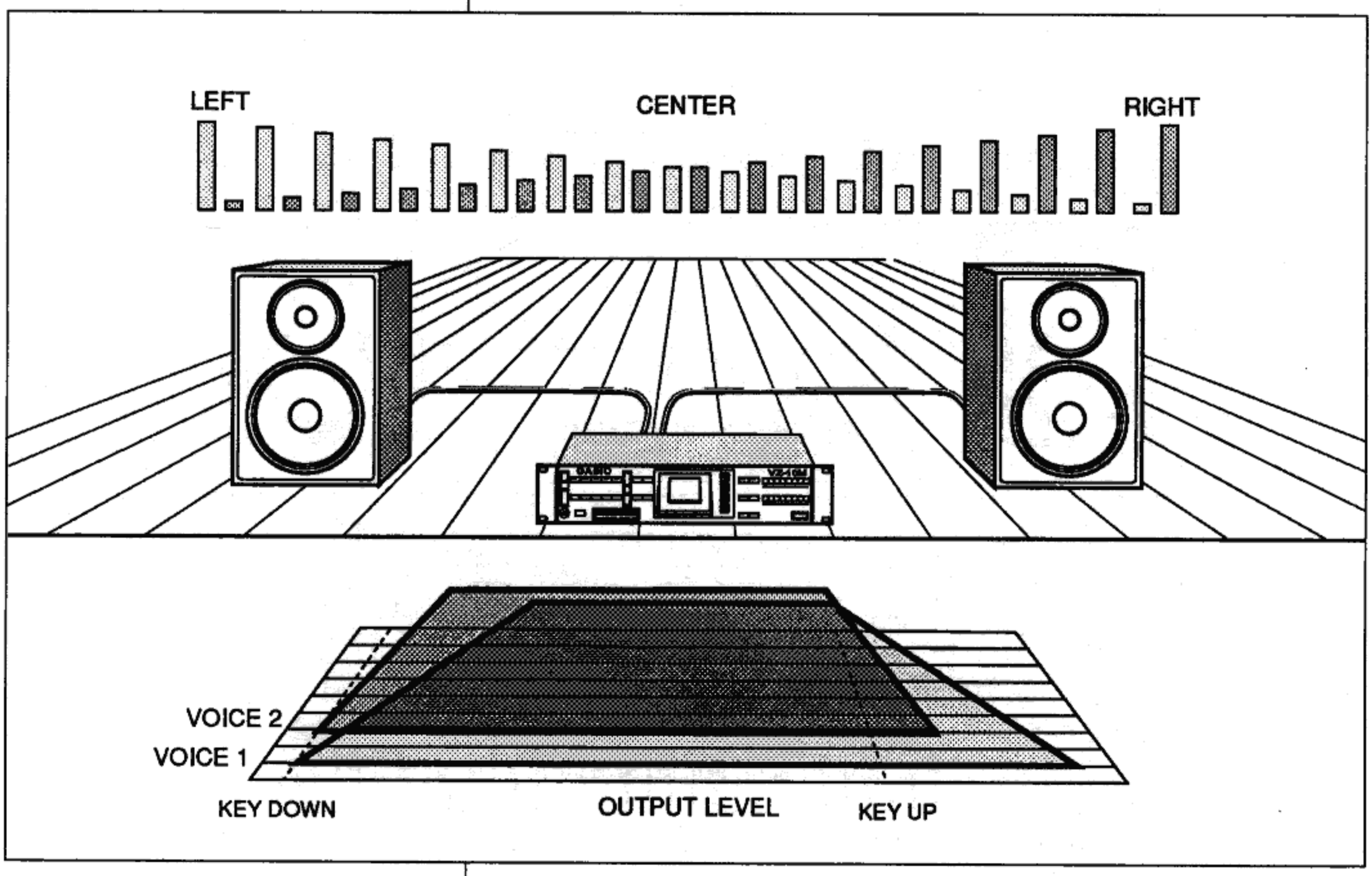
EFFECT MENU

POS X FADE	
EFFECT	ON
POS (FROM)	C2
POS (TO)	C7

A positional pan positions notes according to the locations you play on your controller. Lower notes will sound on the left, higher notes will sound on the right. A positional pan is set up using the X-FADE function:

1. Select a key assign configuration with a stereo layer, like "1+2" or "3+4".
2. Assign the same voice to each side of the layer.
3. Set the X-FADE function to "on."
4. Set the "POS" values to the lowest and highest note of your keyboard, guitar, or wind controller (or to the lowest and highest note in the melody you want to pan).

Envelope Pan



An envelope pan moves the sound between left and right speakers according to AMP ENV rate settings. The pan effect is created by layering two versions of the same sound. Both versions are exactly the same, except that, for one sound, the envelope rates have all been made slightly quicker (or slower). When a note is played, one sound gets louder and softer slightly quicker than the other. This produces the panning effect. This is one of the trickier stereo effects to set up since there may be as many as sixteen sets of envelope parameters to adjust. However, we've found a short cut that works quite well, use the KF RATE function to scale the rates from the keyboard.

1. Select a voice with a fairly slow attack and release. For example, use B-8 "SLOPHASESTR" (Card 2: VZ-1/VZ-10M, Preset 2: VZ-8M). Save a copy of the voice.
2. Edit the KF RATE settings of the copied voice as shown .
3. Select a key assign configuration with a stereo layer, like "1+2" or "3+4".
4. Assign the original voice and its copy to each of the layers.

COMBINATION MODE

KEY ASSIGN
1+2

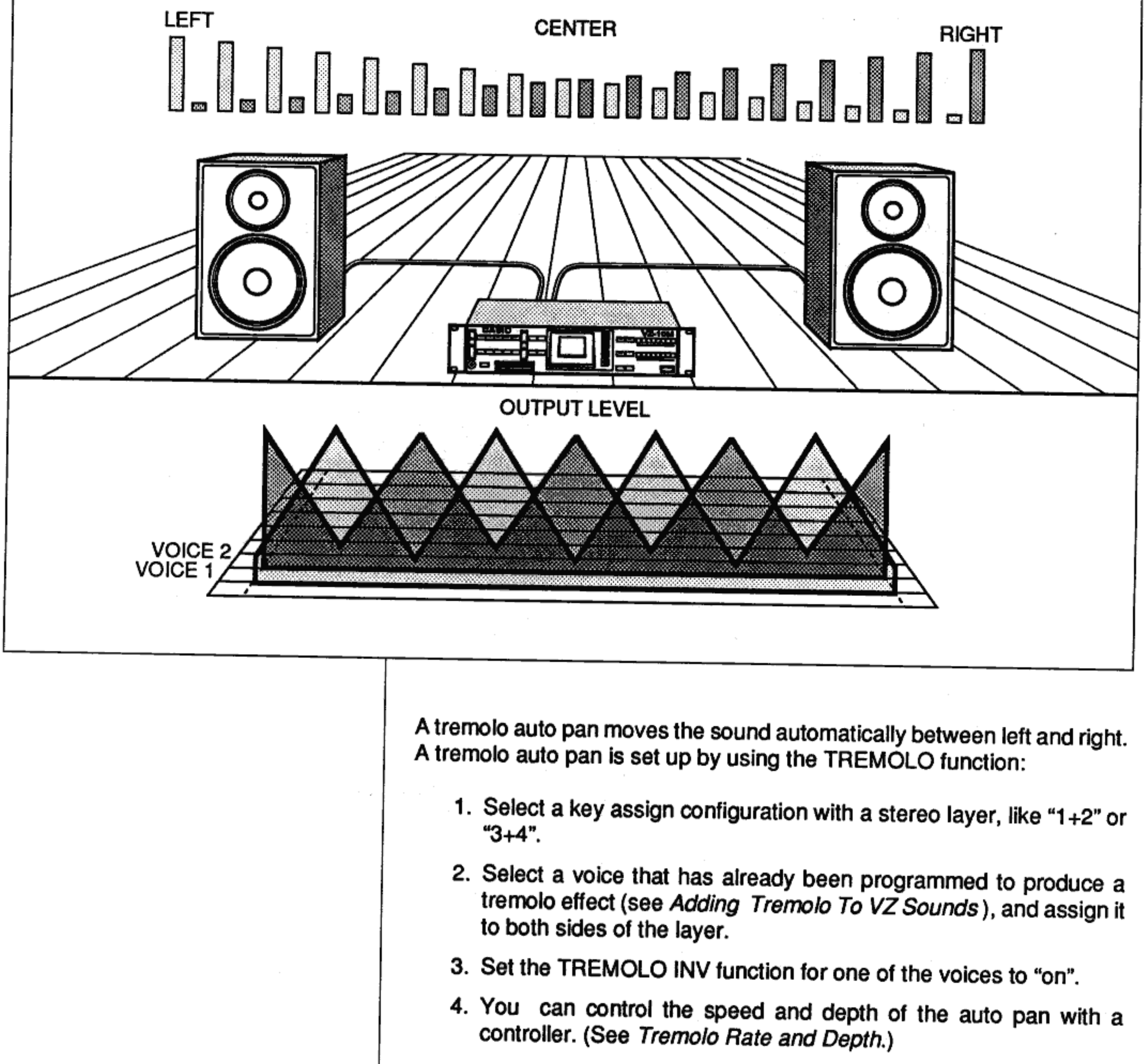
VOICE ASSIGMENT (VZ-1, VZ-10M & VZ-8M)					
1	NO.	B-8	2	NO.	B-7
	NAME	SLOPHASESTR		NAME	SLOPHASE COPY

SAVE A COPY OF VOICE 1
AND ASSIGN IT TO VOICE 2

EFFECT MENU

KF RATE								
POINT	1	2	–	–	–	–	–	–
KEY	C0	C9	–	–	–	–	–	–
LEVEL	10	10	–	–	–	–	–	–

Tremolo Auto Pan



A tremolo auto pan moves the sound automatically between left and right. A tremolo auto pan is set up by using the TREMOLO function:

1. Select a key assign configuration with a stereo layer, like "1+2" or "3+4".
2. Select a voice that has already been programmed to produce a tremolo effect (see *Adding Tremolo To VZ Sounds*), and assign it to both sides of the layer.
3. Set the TREMOLO INV function for one of the voices to "on".
4. You can control the speed and depth of the auto pan with a controller. (See *Tremolo Rate and Depth.*)

COMBINATION MODE

KEY ASSIGN
1+2

VOICE ASSIGMENT (VZ-1, VZ-10M & VZ-8M)					
1	NO.	A-7	2	NO.	A-7
	NAME	HEAVY CLAVI		NAME	HEAVY CLAVI

ASSIGN ANY VOICE WITH LOUDNESS TREMOLO TO BOTH SIDES OF THE LAYER

VOICE PARAMETER MENU

TREMOLO				
WAVE	DEPTH	RATE	DELAY	MULTI
TRIANGLE	40	70	0	OFF

AMP SENS							
M1	M2	M3	M4	M5	M6	M7	M8
0	0	0	7	0	0	0	7

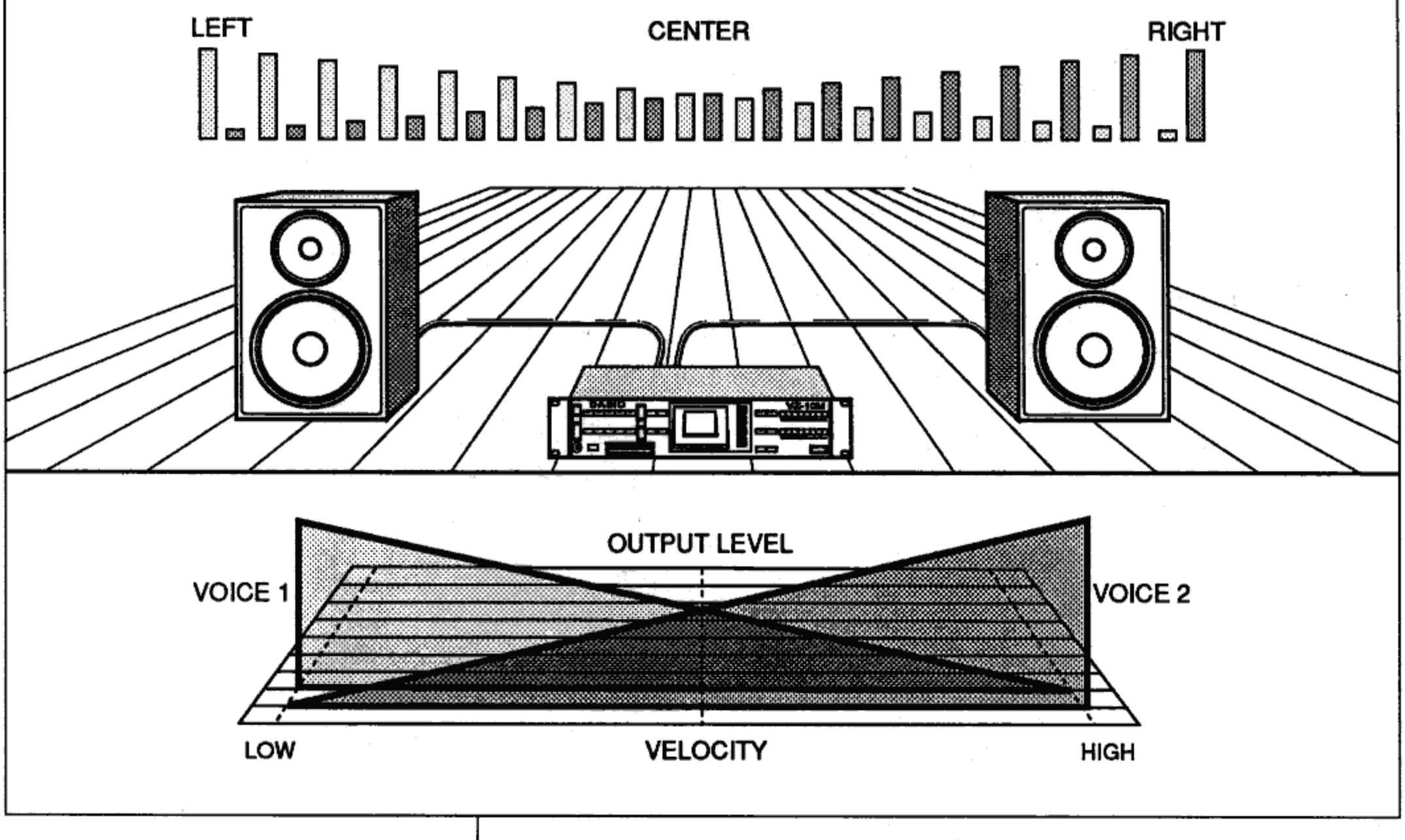
EFFECT MENU

TREMOLO INV				
	1	2	3	4
INVERSE	ON	OFF	–	–

WHEEL OR ANY CONTROLLER				
	1	2	3	4
SENSITIVITY	99	–	–	–
VIB DEPTH	OFF	–	–	–
VIB RATE	OFF	–	–	–
PITCH	OFF	–	–	–
PORTM TIME	OFF	–	–	–
TREM DEPTH	ON	–	–	–
TREM RATE	ON	–	–	–
A ENV BIAS	OFF	–	–	–

ANY VZ CONTROLLER CAN BE USED TO CONTROL TREMOLO PAN DEPTH OR RATE

Velocity Pan



A velocity pan positions notes according to how quickly you push down a key (or how hard you strike a guitar string, or blow into a breath controller.) Lower velocity notes will sound on the left; higher velocity notes will sound on the right. A velocity pan is set up using the VEL INVERSE function:

1. Select a key assign configuration with a stereo layer, like "1+2" or "3+4".
2. Select a voice that has been programmed to produce velocity dynamics (see *Customizing Velocity Curves and Sensitivities*), and assign it to both sides of the layer.
3. Set the VEL INVERSE function for one of the voices to "on".

COMBINATION MODE

KEY ASSIGN
1+2

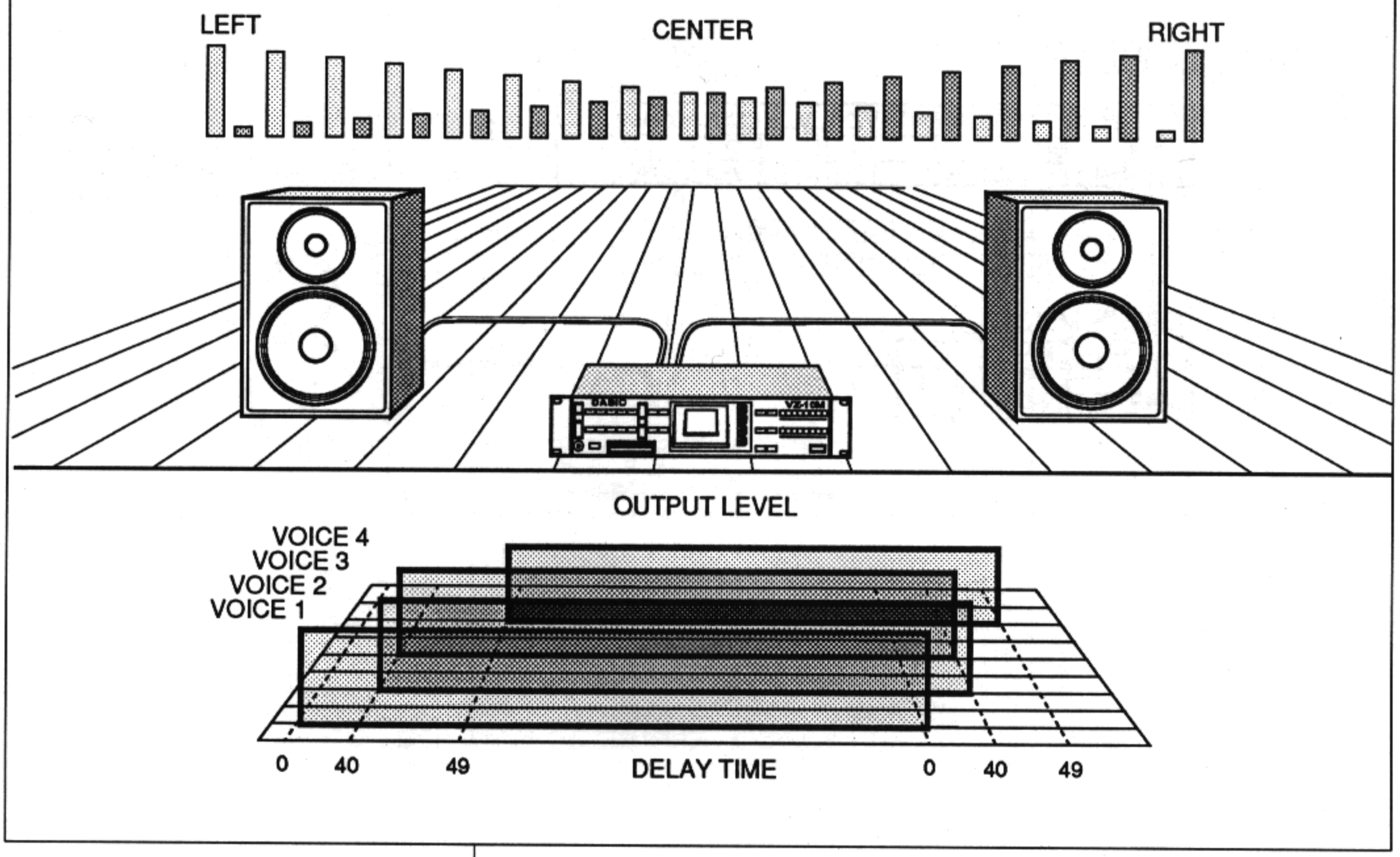
VOICE ASSIGMENT (VZ-1, VZ-10M & VZ-8M)					
1	NO.	D-1	2	NO.	D-1
	NAME	ACOUSTAR		NAME	ACOUSTAR

ASSIGN ANY VELOCITY SENSITIVE VOICE TO BOTH SIDES OF THE LAYER

EFFECT MENU

VEL INV				
	1	2	3	4
INVERSE	ON	OFF	–	–

Delay Pan



The slap echo and ambience effects shown previously in *Combination Delay Echo* sound great in stereo. In order to hear them in stereo you must be sure to use both audio outputs.

1. Select the "1+2+3+4" key assignment configuration.
2. Assign the same voice to each of the four layers
3. Use the DELAY TRIGGER settings shown as guidelines to create the type of panning motion you want: bounce (left – right – left – right), centered (center – left – right), sweep right (left – center – right), or sweep left (right – center– left).
4. Set the COMBI LEVEL values so that the voices become progressively softer. Use the settings shown as a guide.

COMBINATION MODE

KEY ASSIGN
1 + 2 + 3 + 4

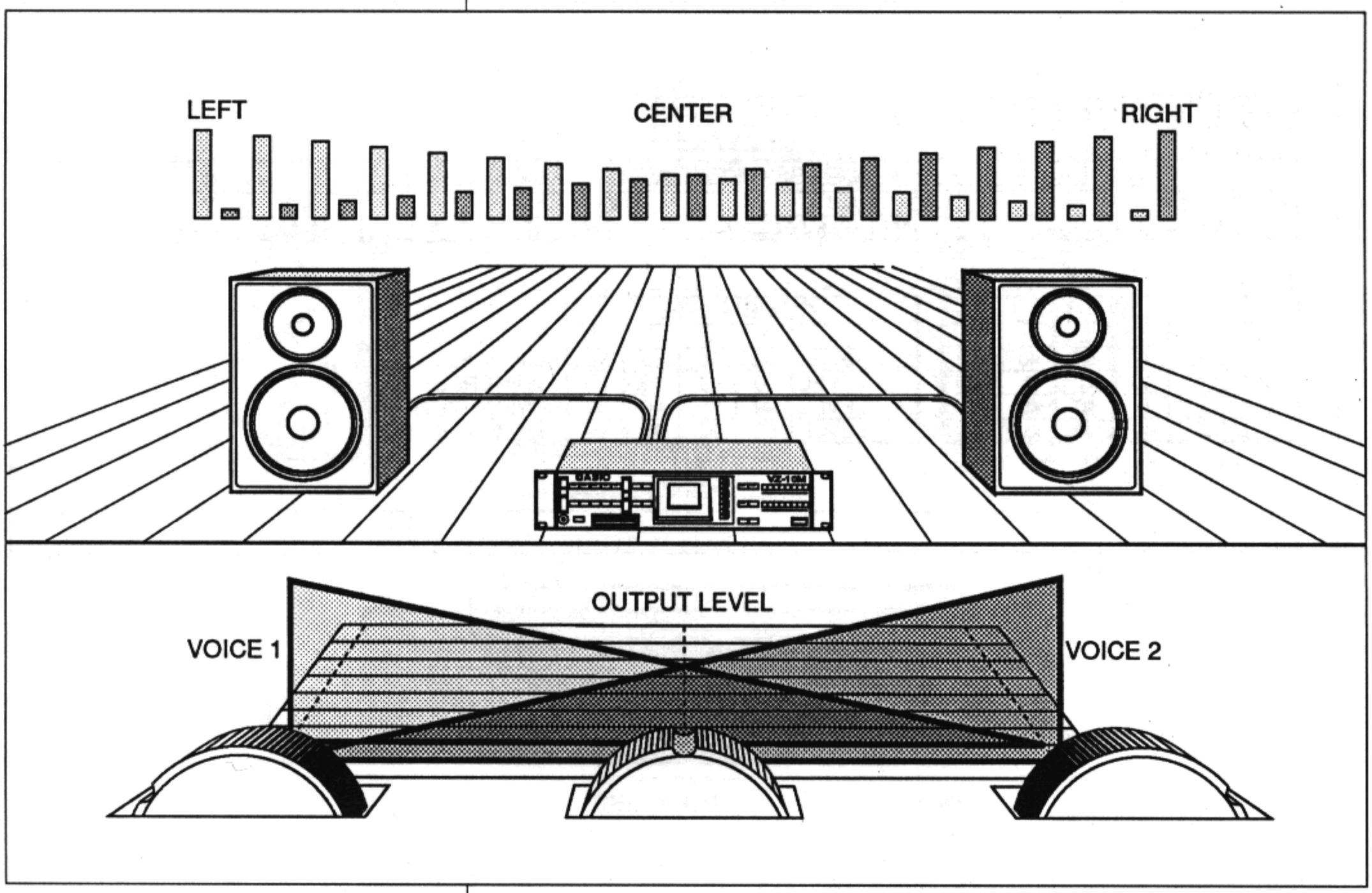
VOICE ASSIGMENT (VZ-1, VZ-10M & VZ-8M)											
1	NO.	A-7	2	NO.	A-7	3	NO.	A-7	4	NO.	A-7
	NAME	HEAVY CLAVI		NAME	HEAVY CLAVI		NAME	HEAVY CLAVI		NAME	HEAVY CLAVI

EFFECT MENU

DELAY TRIG				
	1	2	3	4
DELAY	0	49	40	54
DELAY	40	0	0	49
DELAY	0	40	40	49
DELAY	49	40	40	0

COMBI LEVEL					
	1	2	3	4	
LEVEL	99	90	85	80	(BOUNCE)
LEVEL	90	99	99	85	(CENTERED)
LEVEL	99	90	90	85	(SWEEP RIGHT)
LEVEL	85	90	90	99	(SWEEP LEFT)

Controller Pan



A controller pan positions notes according to movements of a wheel, foot pedal, or other controller. Moving a controller towards its minimum position moves the sound to one side of the stereo mix, moving the controller to its maximum position moves the sound to the opposite side of the stereo mix. You can use any of the following controllers for pan effects in the combination mode: after touch, mod wheel (def wheel 1), def control (def wheel 2, or MIDI controllers 12-31), or foot vr (MIDI controller 4).

1. Select a key assign configuration with a stereo layer, like "1+2" or "3+4".
2. Select a voice that has been programmed to produce loudness change by controlling amp bias, and assign it to both sides of the layer.
3. Set the sensitivity of the desired controller to "+99" for one side of the layer; set it to "-99" for the other side.
4. Moving the controller will pan the voice as you play.

Note: Don't forget that after touch is a controller too. You can use it to pan sounds according to how hard you push the keys of a keyboard, or how hard you blow into a wind controller.

COMBINATION MODE

KEY ASSIGN
1+2

VOICE ASSIGMENT (VZ-1, VZ-10M & VZ-8M)

1	NO.	E-1	2	NO.	E-1
	NAME	SYNTH FLUTE		NAME	SYNTH FLUTE

ASSIGN ANY VOICE TO BOTH SIDES OF THE LAYER

VOICE PARAMETER MENU

TREMOLO				
WAVE	DEPTH	RATE	DELAY	MULTI
–	0	–	–	–

TURN OFF ANY TREMOLO EFFECTS

AMP SENS							
M1	M2	M3	M4	M5	M6	M7	M8
7	7	7	7	7	7	7	7

EFFECT MENU

WHEEL OR ANY CONTROLLER				
	1	2	3	4
SENSITIVITY	+99	-99	–	–
VIB DEPTH	OFF	OFF	–	–
VIB RATE	OFF	OFF	–	–
PITCH	OFF	OFF	–	–
PORTM TIME	OFF	OFF	–	–
TREM DEPTH	OFF	OFF	–	–
TREM RATE	OFF	OFF	–	–
A ENV BIAS	ON	ON	–	–

CONTROL OF PAN POSITION

The Casio VZ synthesizers (as well as the PG guitar) are powerful sound creation devices. They are true synthesizers, offering a formidable toolbox with which to create your own soundscapes.

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