User's Guide

Fizmo
Realtime Transwave Synth

ENSONIQ™
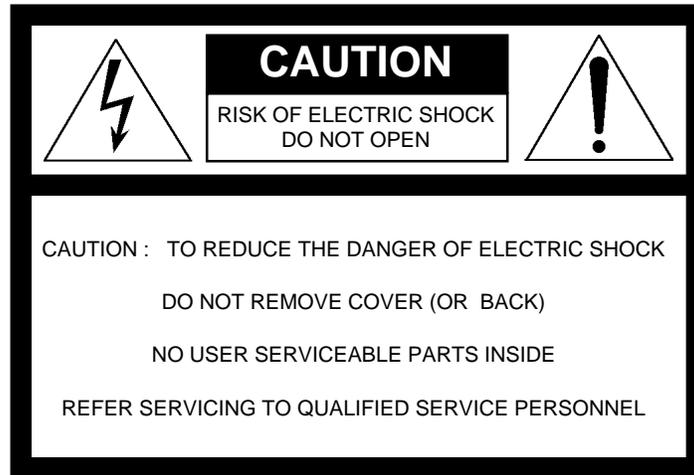
READ THIS FIRST!

WARNING!!

SEE IMPORTANT SAFETY INSTRUCTIONS ON BACK COVER!

ENSONiQ™

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User's Guide
Version 1.10

FIZMO User's Guide

Please record the following information:
Your Authorized ENSONIQ Dealer:_____ Phone:_____

Your Dealer Sales Representative:_____

Serial Number of Unit:_____ Date of Purchase:_____

Your Authorized ENSONIQ Dealer is your primary source for service and support. The above information will be helpful in communicating with your Authorized ENSONIQ Dealer, and provide necessary information should you need to contact ENSONIQ Customer Service. If you have any questions concerning the use of this unit, please contact your Authorized ENSONIQ Dealer first. For additional technical support, or to find the name of the nearest Authorized ENSONIQ Repair Station, call ENSONIQ Customer Service at (610) 647-3930 Monday through Friday.

Although every effort has been made to ensure the accuracy of the text and illustrations in this manual, no guarantee is made or implied in this regard.

IMPORTANT:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

*   Reorient or relocate the receiving antenna.
*   Increase the separation between the equipment and receiver.
*   Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
*   Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to the product not expressly approved by ENSONIQ could void the user's FCC authority to operate the equipment.

In order to fulfill warranty requirements, your FIZMO should be serviced only by an Authorized ENSONIQ Repair Station. The ENSONIQ serial number label must appear on the outside of the unit, or the ENSONIQ warranty is void.

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1—Meet FIZMO

Congratulations on your purchase of ENSONIQ's FIZMO. FIZMO is a unique new synthesizer based on ENSONIQ's exclusive Transwaves: evolving waveforms that provide the basis for incredibly animated, alive sounds. FIZMO utilizes both traditional synth techniques and its own array of potent modulation tools—as well as ENSONIQ's acclaimed effects—to create CD-quality sounds unlike anything heard anywhere else. FIZMO's extensive realtime controls and vocoder allow you to easily shape sounds with your hands and mouth as you play, while its intelligent, interactive arpeggiator pulses away in the background.

Straight out of the box, FIZMO's ready to go, with 64 great-sounding presets pre-programmed by ENSONIQ. Turn the F, I, Z, M and O knobs as you play to hear the selected preset change shape. You can also build your own preset from scratch using FIZMO's many handy front panel knobs.

About the FIZMO User's Guide

Notes, Tips, Warnings

As you read the User's Guide, you'll see notes tips and warnings interspersed throughout the text, offset by their gray background. Each contains a particular kind of information:

- Notes provide additional information relating to the topic being discussed.
- Tips describe applications for the topic under discussion.
- Warnings provide important information that helps you avoid damage to your work, FIZMO or you yourself.

Button Illustrations

Where button or knob illustrations appear in the User's Guide, buttons referred to in the accompanying text are shown in black, while knobs are shown with a black outer ring (except for the FIZMO knobs in *Chapter 3*).

The button referred to in the text

Keyboard   Range   Mode
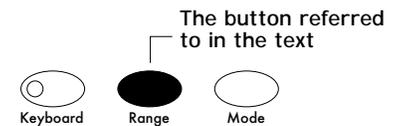
What's in the FIZMO box?

In your FIZMO box, you'll find:

- FIZMO
- a power supply for FIZMO
- the FIZMO User's Guide

Tip: See Page 44 for information on FIZMO's proper care.

The FIZMO Demos

FIZMO contains brief demonstration songs that can give you an idea of its sonic capabilities. To play a demo:

1. Press and hold down the preset bank-selection button.

2. While continuing to hold down the preset bank-selection button, press the +/Yes button, and then release both buttons. The display will show FIZMO's first demo, *d001*.

3. Press the +/Yes button to begin playing the demo. To stop the demo, press the button again.

4. To select the next demo in FIZMO's memory, press the Variations up arrow button in the Effects section of FIZMO's front panel. (To re-select an earlier demo press the down arrow button.)

5. To exit FIZMO's demo-playing mode, press the -/No button.

Preset bank-selection button

Bank 1   Bank 2   -/No   +/Yes

Demo

Variation

-/No
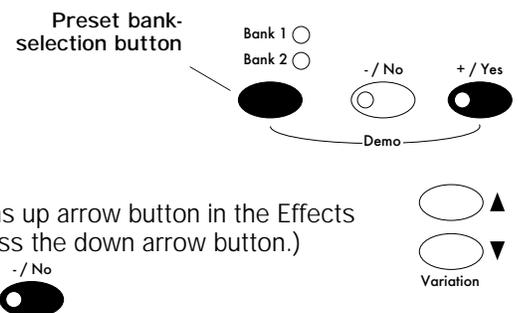
Note: While the demo plays, FIZMO's front-panel controls are de-activated; turning knobs and such will have no effect. When you press the -/No button to exit demo mode, normal functionality is restored.

What *is* a FIZMO Preset?

Whenever you turn FIZMO on and start playing, you're playing
a preset. A preset contains:

*   from one to four sounds.
*   an insert effect or global reverb.
*   an arpeggiator pattern you can turn on or off.
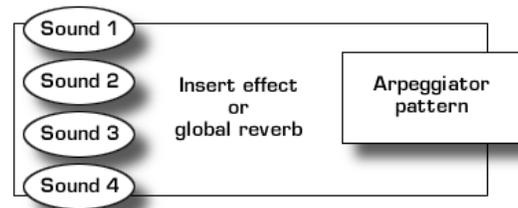
Any of the sounds in a preset can be:

*   layered on top of each other, in the same or different areas of the keyboard.
*   split, so that each sound plays only in a pre-determined portion of FIZMO's keyboard.

Chapter 3 describes how to select and play presets. *Chapter 5* describes how to edit, create and save presets.

About Sounds

A sound in FIZMO is comprised of up to two oscillators, each of which plays one of FIZMO's onboard waves.
Most of the knobs on FIZMO's front panel allow you to change the characteristics of the currently selected
oscillator. *Chapter 5* describes how to select any of FIZMO's 256 sounds, as well as how to layer and split
sounds in a preset. *Chapter 6* describes how to select and edit oscillators, and provides a description of waves.

Note: Since each preset can contain up to four sounds, and each sound can contain up to two oscillators—each
of which plays its own wave—a preset can utilize up to eight different oscillators and waves.

Note: When you press a key on the keyboard, each active oscillator plays its wave. FIZMO can sound up to 48
waves at a time; therefore, the number of notes that can be played simultaneously depends on the number of
sounds and oscillators active in the current preset.

About Effects

A preset's sounds can be processed by any one of FIZMO's large selection of onboard 44.1 kHz (CD-quality)
effects. These effects fall into two basic categories:

*   FIZMO's global reverbs can provide a natural ambience to your preset.
*   FIZMO's insert effects are powerful effects that perform a wide variety of processing tasks, from reverbs to
    delays, choruses to distortions as well as some unique ENSONIQ-exclusive effects. The vocoder, introduced
   below, is one of the insert effects.

Each FIZMO effect is pre-programmed with its own set of variations from which to choose. Chapter 5 discusses
selecting and editing effects.

Introducing the FIZMO Vocoder

FIZMO includes a special effect called a "vocoder." Vocoders were popular in the 1970's, and can be heard on
many records of that era. A vocoder is an interactive filter that allows you to use your mouth to shape a preset's
frequency content. When an effect that uses the vocoder is selected, you can speak or sing into a microphone
plugged into FIZMO's rear-panel Audio Input jack: the frequencies of the notes you play on the keyboard as you
speak or sing will mimic the shape of your mouth, making FIZMO's notes sound as if they're being sung. The
vocoder is described in *Chapter 5.*

The FIZMO Arpeggiator

An arpeggiator is a device that records notes struck on the keyboard and plays them back repeatedly in pre-
programmed patterns. FIZMO's arpeggiator provides a variety of ways in which you can add notes to a pattern,
as well as a wide selection of options that allow you to set how the arpeggiator plays its notes. FIZMO's
arpeggiator is also MIDI-interactive. *Chapter 4* describes the arpeggiator in detail.

FIZMO's Display

P 01 FIZMO's 4-character LED display provides information as you adjust FIZMO's settings. Many settings have their own knobs—in such a case, the display shows you the setting's current value when you turn its knob. Some settings, called "parameters," are accessed by pressing the appropriate button on FIZMO's front panel. Values and parameters names are often shown in abbreviated form on FIZMO's display, as noted throughout the User's Guide.

Tip: Most of FIZMO's display abbreviations appear in the User's Guide Index; if you see something you don't understand, the Index can direct you to an explanation.

The -/No and +/Yes Buttons

As you work on FIZMO, you'll find numerous settings whose values you'll want to raise or lower, and features you'll want to activate or de-activate. To perform either of these tasks, press the -/No or +/Yes button:

- To lower a displayed value, click the -/No button.
- To raise a displayed value, click the +/Yes button.
- To activate a displayed feature, press the +/Yes button.
- To de-activate a displayed feature, press the -/No button.

Tip: To increment or decrement through values at a greater speed, double-click the desired button, holding it down after the second click. To move at high speed, triple-click the button, holding it down after the third click.

How FIZMO's Memory Works

FIZMO contains three types of memory, RAM ("Random Access Memory"), ROM ("Read-Only Memory") and FLASH:

- RAM is a form of memory that can be written to and read from instantaneously. It's also impermanent, and is cleared when FIZMO is turned off.
- FLASH is a form of memory ideal for saving data that you want to retain permanently, or until you manually change it. Data must be burned into FLASH, a slightly slower process than writing data to RAM.
- ROM is a permanent, unchangeable form of memory that contains factory-programmed data such as waves and other items that FIZMO requires to operate.

FIZMO's presets, sounds, arpeggiator data and global settings are stored in FLASH so that they're in place each time you power up FIZMO. When you select a preset, its components are automatically—and instantly—copied into RAM so that they can be played, shaped in realtime and edited. When you save a preset (Page 20) or your current global settings (Page 34), you'll see the word "𝗯𝘂𝗿𝗻" displayed during the saving process, indicating that your data is being burned into FLASH. When you update FIZMO's operating system—the software code that makes it run—it, too, will be burned into FLASH automatically (see Page 41).

2—Setting Up

Listening to FIZMO

There are essentially two ways to hear the sound FIZMO produces:

• You can listen to FIZMO by connecting its outputs to a mixer or amplifier and listening to the mixer or amplifier.
• You can listen to FIZMO through headphones.

Connecting FIZMO to a Mixer or Amplifier

To Listen to FIZMO in Stereo

1. Connect one end of a 1/4″ audio cable to FIZMO's rear-panel Left Main Out jack.
2. Connect the other end to an input on your mixer or amplifier.
3. Connect one end of a second 1/4″ audio cable to FIZMO's Right Main Out jack.
4. Connect the other end of the cable to a second input on your mixer or amplifier.
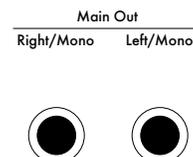
To Listen to FIZMO in Mono

1. Connect one end of a 1/4″ mono cable to either of FIZMO's rear-panel Main Out jacks—when you connect a cable to a single Main Out jack, FIZMO sends all of its sound out of the connected jack in mono.
2. Connect the other end to an input on your mixer or amplifier.

Tip: You can use 1/4″-to-RCA-type adapters to connect FIZMO to a home stereo, but do so with care, since the dynamic range of FIZMO is much greater than that of a CD or tape, and can damage your speakers if set to too high a volume. Follow the guidelines in "Setting FIZMO's Output Volume" below to avoid damage to your system.

Connecting FIZMO to Headphones

1. Connect your 1/4″ stereo headphone plug to the Phones jack on FIZMO's rear panel.

Tip: If your headphones use a mini plug, you can buy an inexpensive mini-to-1/4″ adapter that will allow you to connect the headphones to FIZMO.

Setting FIZMO's Output Volume

FIZMO, like all digital equipment, sounds best when its Volume knob is all the way up. If you've connected FIZMO to a mixer or amplifier, use their input level control to find a level for FIZMO that works with the rest of your gear. When FIZMO is connected to a home stereo, turn FIZMO's Volume knob all the way down, power up (described later in this chapter) and, while playing FIZMO's keyboard as hard as you plan to, slowly turn up its Volume knob to find a volume that sounds good without distorting your stereo's inputs.

Note: Each of FIZMO's oscillators has its own Amp setting that controls the oscillator's volume. The Volume knob described above controls FIZMO's overall level.

Using FIZMO's Audio Input

The rear-panel Audio Input jack allows you to connect a microphone or line-level audio signal to FIZMO in order to control its vocoder or to process external audio through its onboard insert effects. The input volume is set using the Input Level knob located to its right (when viewed from the back), as described in the following section.
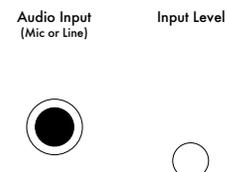
Setting the Audio Input Volume

To set the optimal input volume:

1. After connecting a microphone or line-level signal to the Audio Input jack, speak into the microphone or send audio at a typical volume into FIZMO.
2. Adjust the input volume by slowly turning the rear-panel Input Level knob up or down until the Input Clip LED just above the Effects section of FIZMO's front panel lights occasionally.

☆Input Clip

Routing a Microphone to an Insert Effect

A microphone connected to FIZMO's Audio Input jack will always be routed to the vocoder insert effect (see Page 19). You can also send the microphone's audio to any other insert effect. To do this, tap the MIDI Edit button until *Lnl n* (for "Line In") is displayed; in a moment or so, the current *Lnl n* value will be displayed. Use the -/No or +/Yes button to set the parameter to:

• *On* to direct the microphone's audio to any of FIZMO's insert effects.
• *OFF* to direct the microphone's audio only to the vocoder insert effect.

Tip: To learn about insert effects, see Page 18.

Note: Whenever *Lnl n* is set to its On value, you'll hear your microphone through the currently selected insert effect. If you're hearing unexpected sounds through your effects, make sure to set the *Lnl n* parameter to *OFF*.

Connecting a Dual Foot Switch to FIZMO

Dual Foot Switch (Sustain)

You can connect an ENSONIQ SW-10 dual foot switch—purchased separately—to FIZMO's Dual Foot Switch jack. With an SW-10 installed, you can use your feet for selecting presets, starting, stopping and latching the arpeggiator, setting the arpeggiator's tempo and for realtime modulation.

Programming the Behavior of a Dual Foot Switch

The behavior of the pedals of a dual foot switch are determined by the settings of the *Ft 1* and *Ft 2* parameters—the *Ft 1* parameter sets the behavior of the right-hand pedal, and the *Ft 2* parameter sets the behavior of the left pedal. To set either parameter's value:

MIDI

Edit

1. After connecting an SW-10, tap the MIDI Edit button repeatedly until the desired parameter—*Ft 1* or *Ft 2*—appears. After roughly one second, the parameter's current setting will be displayed.
2. Press the -/No or +/Yes button to select the desired value for the parameter.

When you select:	the pedal will:
OFF	do nothing.
SuS	function as a traditional sustain pedal.
SoS	operate as a traditional sostenuto pedal.
SYS1	send a value of 127 to any setting modulated by Sys1 (Page 21).
SYS2	send a value of 127 to any setting modulated by Sys2 (Page 21).
SYS3	send a value of 127 to any setting modulated by Sys3 (Page 21).
SYS4	send a value of 127 to any setting modulated by Sys4 (Page 21).
ArP	toggle the arpeggiator on or off (*Chapter 4*).
ArPL	route the keyboard to the arpeggiator while the pedal is held down (Page 12).
tAP	allow you to set the FIZMO's system tempo by tapping the pedal (Page 13).
iPrS	the next-highest preset in the current preset bank (Page 9) will be selected.
dPrS	the next-lowest preset in the current preset bank (Page 9) will be selected.

Tip: If you don't require the extended functionality of a dual footswitch, you can purchase and connect an ENSONIQ SW-2 single footswitch to FIZMO's foot-switch jack. The *Ft 1* parameter will control its behavior.

Making MIDI Connections

Before FIZMO can transmit or receive MIDI data—as described in *Chapter 7*—its rear-panel MIDI jacks must be connected to the rest of your MIDI studio. Each jack handles a particular task:

MIDI
Thru   Out   In

• MIDI Thru—When FIZMO is part of a MIDI daisy-chain, with one MIDI device connected to another and that one to the next so on, any MIDI data FIZMO receives is passed along from this jack to the next device in the daisy-chain.

• MIDI Out—This jack transmits MIDI data generated by FIZMO, including data produced by its keyboard, arpeggiator, FIZMO knobs or during a SysEx data dump.

• MIDI In—FIZMO receives MIDI data from external devices using the MIDI In jack. You can use MIDI to play FIZMO, add notes or supply timing information to its arpeggiator, and receive dumps of SysEx data.
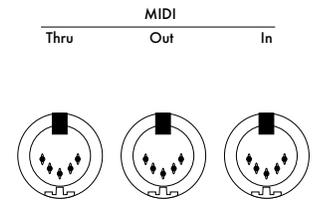
Supplying Power to FIZMO

Warning: Before connecting FIZMO's power supply, make sure that FIZMO's rear-panel Power button is in its "out" position.

Tip: See Page 45 for additional information on polarization and grounding.

Connect the small plug of FIZMO's AC power supply to FIZMO's rear-panel Power In jack. Connect the other end to a standard household outlet (if the supplied adapter doesn't match your outlet, contact your authorized ENSONIQ dealer).

Power In
9V AC, 1A

Turning On FIZMO

Warning: As with all audio equipment, before turning FIZMO on, turn down your monitoring system to avoid any unwanted level spikes.

Power
Off   On

To turn FIZMO on, press its rear-panel Power button until it latches in its On—pushed-in—position.

3—Playing FIZMO

Playing FIZMO is all about enjoying its presets and manipulating them. This chapter describes the selection of presets and FIZMO's realtime performance controls.

Note: Presets are described in *Chapter 1*.

Selecting Presets

FIZMO contains 64 presets arranged into two banks of 32 presets each, a bank being a collection of presets.

Preset-Selection Mode

To select a preset, you must first enter FIZMO's preset-selection mode. You can tell if you're in preset-selection mode by looking at FIZMO's display or at the Bank 1 and Bank 2 LEDs located underneath and just to the left of FIZMO's display. When you're in preset-selection mode, a "*P*" appears in the left side of the display, and one of the two LEDs will be lit. If this is not the case, you can enter preset-selection mode by selecting a preset bank, as described below.

"*P*" shows that you're in preset-selection mode.
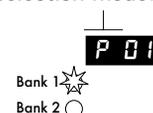
Bank 1
Bank 2

Selecting a Preset Bank

To select one or the other preset bank, click the preset bank-selection button. Each click selects one or the other of the two preset banks, as indicated by the Bank 1 and Bank 2 LEDs. When a bank is selected, its LED lights.

Bank 1
Bank 2

Preset bank-selection button
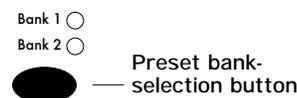
Selecting a Specific Preset

Click the -/No and +/Yes buttons to select an individual preset from either preset bank. The number of the currently selected preset is shown in FIZMO's display.
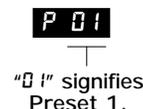
Tip: See Page 37 for a list of FIZMO's presets.

"*0 !*" signifies Preset 1.

Realtime Performance Controls

FIZMO's realtime performance controls allow you to simultaneously re-shape all of a preset's sounds as you play. These controls have an immediate effect on the presets, and are thus called "realtime" controls. The realtime performance controls do not permanently change the currently selected preset—when you next select it, it will be restored to its original state. To permanently alter a preset, you must edit it (*Chapter 5*) or its sounds (*Chapter 6*).

Note: Most the many FIZMO knobs and buttons dedicated to editing also result in instantly heard changes. They are described in *Chapters 5* and *6*.

Note: FIZMO's realtime controls also transmit MIDI data from FIZMO's MIDI Out jack as described in *Chapter 7*.

Keyboard Performance Controls

You can affect the way a preset sounds by how you play FIZMO's keyboard:

• The keyboard is velocity-sensitive, so that it senses how hard or soft you play. In addition to affecting the volume of the notes you hear, velocity can be used to change the value of various oscillator settings.
• When you strike a key and press it down, the keyboard generates channel pressure messages that can also affect oscillator or effect settings.

Tip: Most of the effects in factory-programmed presets are designed to respond to velocity and/or pressure.

To learn how to program oscillators to respond to velocity and pressure, see "Modulation" in *Chapter 6*.

Setting the Keyboard's Velocity Response

You can adjust the FIZMO keyboard's response to the force with which you play, allowing you to get the most out of FIZMO's sounds, regardless of how hard you like to play. To set this parameter:

MIDI

1. Press the MIDI Edit button repeatedly until "ŁcH" is displayed—after approximately one second, the current velocity curve value will be displayed.

Edit

2. Press the -/No or +/Yes button to select one of the six available velocity curves:
    • Curve 1 is designed for musicians who play softly, while Curve 4 will suit players who play hard. Try each curve to find the setting with which FIZMO's sounds feel most responsive to your playing.
    • Curve 5 causes the keyboard to always play as if you've struck its keys with a medium amount of force (a MIDI velocity value of 64).
    • Curve 6 causes the keyboard to always play as if you've struck its keys with a maximum amount of force (a MIDI velocity value of 127).

The Pitch Bend and Mod Wheels

The two wheels to the left of FIZMO's keyboard are its pitch bend wheel—on the left—and mod wheel—on the right. These two wheels can be moved as you play; each has its own effect on the currently selected preset.

The Pitch Bend Wheel

The pitch bend wheel bends the pitch of notes upward when the wheel is pushed forward, or downward when it's pulled back. In its center position, no pitch-bend is applied. When shipped from the factory, the wheel bends pitch by up to two semitones. To change the maximum pitch bend amount, tap the MIDI Edit button until *bEnd* appears in FIZMO's display—in a moment, the *bEnd* parameter's current value will appear. Use the -/No or +/Yes button to select the desired maximum amount of pitch-bending.

MIDI

Edit

Tip: FIZMO can bend only those notes currently held down, letting sustained notes remain at their original pitch. To activate held pitch-bending, tap the MIDI Edit button until *PHLd* appears in FIZMO's display—in a moment, the parameter's current value will appear. Use the -/No or +/Yes button to set the *PHLd* parameter to "*On*."

The Modulation Wheel

The modulation wheel (or "mod wheel") can be used to raise the value of any of FIZMO's modulators programmed to respond to the mod wheel. These modulators can be applied to various oscillator and effect settings. The mod wheel is typically used for adding vibrato to sounds. Modulation is described on Page 21.

The FIZMO Knobs

The easiest way to shape FIZMO presets in realtime is to turn the F-I-Z-M-O knobs. The presets created at the factory are programmed to respond to these knobs in enjoyable ways, as described on Page 37.

When you twist the:	*it:*
F knob	adjusts the value of any setting to which Sys3 is applied as a modulator (Page 21). In all factory-programmed sounds, Sys 3 modulates preset effects (Page 18).
I knob	selects from among the frames in the preset's Transwaves (Page 26).
Z knob	adjusts the filter cutoffs of the preset's oscillators (Page 28).
M knob	detunes the preset's oscillators (Page on page 21).
O knob	adjusts the value of any setting to which Sys4 is applied as a modulator (Page 21).

Effect modulation —— F I Z M O —— Sys4 control

Wave modulation ——⅃ Brightness ⌐— Detuning
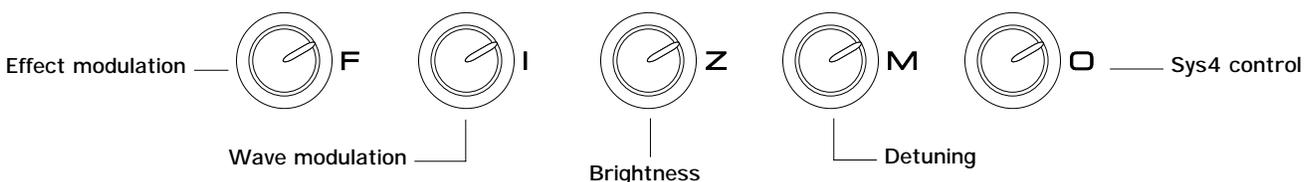
Tip: You can make your current FIZMO knob settings permanent by saving the preset—see Page 20.

4—The Arpeggiator

FIZMO's arpeggiator produces mesmerizing, repetitive streams of musical notes using the active sounds in the currently selected preset. The arpeggiator can play both pre-programmed phrases, and can generate fantastic new music based on notes that you play. You can also play along with the arpeggiator.
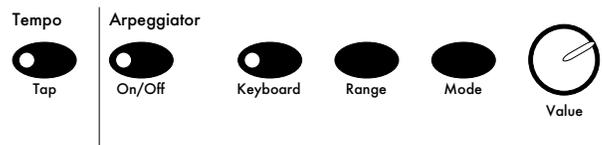
Tip: The arpeggiator can be synchronized to MIDI clocks so that you can synchronize it to an external MIDI device. You can also supply the arpeggiator with notes via MIDI. See *Chapter 7.*

Understanding Arpeggiator Presets

Whenever you use the arpeggiator, you're using an "arpeggiator preset." An arpeggiator preset tells the arpeggiator what notes to play, and how to play them by determining the arpeggiator's operating mode and also containing a variety of parameters that influence certain important aspects of its behavior (these are detailed in "Editing Arpeggiator Presets" on Page 13).

Note: Each FIZMO preset contains an arpeggiator preset, and remembers the current state of the arpeggiator's other settings when the preset was last saved. Therefore, when you change any arpeggiator setting, the LED in the Sound Edit button lights to show that the preset has been edited. See Page 20 to learn how to save a preset—and your current arpeggiator settings.

Arpeggiator Operating Modes

The arpeggiator can function in either of two modes, or a combination of both. The operating mode is determined by the type, or types, of information the arpeggiator preset contains. An arpeggiator preset can contain a:

• pattern—A pattern is a pre-programmed phrase containing note or controller data. When an arpeggiator preset contains a pattern, you can transpose its note data to any key or octave by striking a key on FIZMO's keyboard.

• control algorithm—A control algorithm allows you to play notes into the arpeggiator, and tells the arpeggiator in what order to play those notes.

Turning the Arpeggiator On and Off

To turn the arpeggiator on, click the Arpeggiator On/Off button—when the arpeggiator is on, the button's LED lights.

Tip: You can also turn the arpeggiator on and off using a foot switch—see Page 6.

Selecting an Arpeggiator Preset

FIZMO contains over a hundred arpeggiator presets. To select one:

1. Click the Arpeggiator Mode button—or hold down the button and turn the Arpeggiator Value knob—until *Pr5t* is displayed. In a moment or so, the number of the currently selected arpeggiator preset will be displayed.

2. Turn the Arpeggiator Value knob or use the -/No or +/Yes button to select the desired arpeggiator preset. The arpeggiator preset already saved in the preset is shown as *Snd*; the other arpeggiator presets are identified by number.
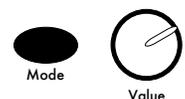
Tip: For a list of FIZMO's arpeggiator presets, see Page 40.

Tip: The control algorithm contained in the highest-numbered arpeggiator preset performs a unique function: any notes you supply to the arpeggiator are sustained for as long as the arpeggiator is turned on.

The Arpeggiator Keyboard Button

The Arpeggiator Keyboard button determines whether FIZMO's keyboard—and incoming MIDI notes; see Page 31—will supply notes to the arpeggiator, or will bypass the arpeggiator and play the sounds of the currently selected preset. When you save a preset, it remembers the current state of the Keyboard button. The Keyboard button contains an LED; each time you press the Keyboard button, the LED turns on or off. When the LED is:

Keyboard

• lit, you can give the arpeggiator notes to play, and/or transpose an arpeggiator pattern, using the keyboard. You can also use FIZMO's pitch bend and modulation wheels to manipulate the notes the arpeggiator plays.

• unlit, you can play along with the arpeggiator.

Tip: The setting of the HELd arpeggiator preset parameter determines how you can supply the arpeggiator notes when using a control algorithm. See "Held Mode and Control Algorithm Notes" on Page 14.

You can set the keyboard's behavior on a system-wide level so that it behaves in the manner you find most convenient. To do this, tap the MIDI Edit button until bPAS (for "Arpeggiator Bypass parameter") is displayed; in a moment or so, the parameter's current value will be displayed. Use the -/No or +/Yes button to set it to:

Value:	Displayed as:	So that:
Bypass Off	OFF	the keyboard always supplies notes to the arpeggiator.
Bypass On	On	the keyboard always plays the current preset.
Preset	PSEt	when a new preset is selected, FIZMO will set the Keyboard button and LED to the on/off state stored in the preset.
Arpeggiator On/ Off	ArP	if the arpeggiator is turned on, the keyboard will supply it notes; if it's off, the keyboard will play the currently selected preset.

Note: You can override the setting of the Arpeggiator Bypass parameter at any time by pressing the Keyboard button manually.

Note: When shipped from the factory, the Arpeggiator Bypass parameter is set to ArP.

Tip: You can use a foot switch to temporarily direct the keyboard to the arpeggiator—see Page 6.

The Tempo Button

You can set the tempo of the currently selected arpeggiator preset by tapping the Arpeggiator Tempo button—when you press the button, the current tempo value is displayed in beats per minute (bpm). The arpeggiator's tempo can be set anywhere from 25 bpm (t25) to 320 bpm (t320). The Tempo button's LED is always flashing, showing the current arpeggiator tempo.

Tempo

Tap

Tip: You can also hold down the Arpeggiator Tempo button and turn the Arpeggiator Value knob to set the tempo. In addition, once you've pressed the Arpeggiator Tempo button, you can use the -/No or +/Yes button to set the tempo.

The system-wide Arpeggiator Tempo Source parameter allows you to set the behavior of the arpeggiator's tempo as you select presets. To access and set this parameter, tap the MIDI Edit button until AtP0 is displayed; in a moment or so, the parameter's current value will be displayed. Use the -/No or +/Yes button to set it to:

Value:	Displayed as:	So that:
Preset	PSEt	When a new preset is selected, the arpeggiator tempo will be set to the tempo stored in the preset.
Front panel	FPnL	the tempo selected using the Tempo button will remain in place when a new preset is selected.

Note: You can override the setting of the Arpeggiator Tempo Source parameter at any time by setting the Arpeggiator Tempo from the front panel.

Note: When shipped from the factory the Arpeggiator Tempo Source parameter is set to FPnL.

Note: Some factory presets may not contain a tempo. The currently selected tempo will remain in place when such a preset is selected, even when the Arpeggiator Tempo source parameter is set to *PSEt*.

The Arpeggiator Tempo, AKA the System Clock

The arpeggiator tempo setting provides timing information to more than just the arpeggiator. It's also the system clock, providing a timing reference for oscillator LFOs and noise generators (see Page 25), as well as various time-based preset effects accessible with computer editing software. This allows for the programming of sounds and preset effects whose elements are synchronized with each other and/or with external MIDI devices.

Note: The arpeggiator tempo/system clock—and therefore FIZMO's arpeggiator, sounds and effects—can be controlled by incoming MIDI clocks. See Page 31.

The Range Button

The Arpeggiator Range button allows you to extend the number of octaves over which the arpeggiator's notes will be played when using an arpeggiator preset that contains a control algorithm. When the arpeggiator's range is set to *Oct0*, its notes will play in their original range.

When the arpeggiator range is:	the arpeggiator notes will play in their original octave, as well as:
Oct1	an octave above and below the original range.
Oct2	two octaves above and below the original range.
Oct3	three octaves above and below the original range.
Oct4	four octaves above and below the original range.

To set the arpeggiator range, tap the Range button.

Tip: You can also hold down the Arpeggiator Range button and turn the Arpeggiator Value knob to set the desired octave range. In addition, once you've pressed the Arpeggiator Range button, you can use the -/No or +/Yes button to for this purpose.

Note: The Range setting respects the low-note/high-note boundaries set with the *Lo n* and *Hi n* arpeggiator preset parameters (Page 13), allowing you to extend the octave ranges of the arpeggiator's notes only in the desired high or low direction.

Editing Arpeggiator Presets

Each arpeggiator preset contains a collection of parameters that allow you to set its sound and behavior. To select and edit these parameters, tap the Arpeggiator Mode button—or hold down the Arpeggiator Mode button and turn the Arpeggiator Value knob—until the desired parameter is displayed. In a moment or so, the selected parameter's value will be displayed. Turn the Arpeggiator Value knob, or use the -/No or +/Yes button to select the desired value. The parameters are:

Parameter:	Displayed as:	What it does:
Preset	*PrSt*	selects an arpeggiator preset by number; see Page 11.
Note Resolution	*nrES*	sets the rhythmic value of each note when using a control algorithm; may be set to *HOLE* (whole note), *HALF* (half-note), *Qtr* (quarter note), *8th* (eighth note), *16th* (sixteenth note), *32nd* (thirty-second note), *32n3* (thirty-second-note triplet), *16t3* (sixteenth-note triplet), *8th3* (eighth-note triplet), *Qtr3* (quarter-note triplet), *HLF3* (half-note triplet), *HOL3* (whole-note triplet)
Note Duration	*ndur*	sets the length of notes as a percentage of the current *nrES* value
Feel	*FEEL*	adds a pre-programmed musical feel to notes used by control algorithm; range is *OFF*, *1-49*; values *1-25* add swing, from 50% to 75% (*13*=63%)
Minor Thirds	*-3rd*	adds a minor third to notes when using a control algorithm; can be *OFF*, *On*
Thirds	*3rd*	adds a major third to notes when using a control algorithm; can be *OFF*, *On*

Parameter:	Displayed as:	What it does:
Fourths	4th	adds a fourth to notes when using a control algorithm; can be OFF, On
Fifths	5th	adds a fifth to notes when using a control algorithm; can be OFF, On
Octaves	Oct	adds an octave to notes when using a control algorithm; can be OFF, On
Low Note	Lo n	sets the lowest-pitched note that arpeggiator will accept from keyboard when supplying notes to control algorithm; also sets the lowest note that arpeggiator will play
High Note	Hi n	sets the highest-pitched note that arpeggiator will accept from keyboard when supplying notes to control algorithm; also sets the highest note that arpeggiator will play
Touch	tch	when set to OFF, all arpeggiator notes play at a MIDI velocity of 127; when set to On, arpeggiator uses velocity of notes played on keyboard
Center Range	CEnt	when set to On, moves notes played by a control algorithm to an octave location centered around Middle C; when set to OFF, notes play in original octaves
Note Limit	nLLt	limits the number of notes the arpeggiator will play before repeating
Held Mode	HELd	when set to On, arpeggiator remembers last notes played on keyboard or via MIDI; when set to OFF, arpeggiator remembers notes only for as long they're held down on keyboard or played via MIDI; see "Held Mode and Control Algorithm Notes" below

Note: You can activate one of the arpeggiator intervals—-3rd, 3rd, 4th, 5th, Oct—at a time. If you activate a new interval when another is already turned on, the old interval will be replaced by the new one.

Note: Some arpeggiator presets may contain added minor 3rds, 3rds, 4ths, 5ths or octaves. In such cases, the settings for the -3rd, 3rd, 4th, 5th and Oct parameters will be ignored.

Note: Setting the -3rd, 3rd, 4th, 5th or Oct parameters to On may cause notes to sound beyond the low-note/high-note boundaries established with the Lo n and Hi n parameters.

Held Mode and Control Algorithm Notes

The setting of the HELd arpeggiator preset parameter, described above, determines the manner in which you can supply notes to be played by a control algorithm. When the HELd parameter is set to:

- OFF, the arpeggiator remembers notes only for so long as they're being played. Once you stop playing the notes, the control algorithm stops paying them as well.
- On, the arpeggiator remembers the last notes you supplied it. After you stop playing them on FIZMO's keyboard or from an external MIDI device, the control algorithm continues to play the notes until you turn the arpeggiator off, or supply it new notes. You can add notes to those already being played by the control algorithm in either of two ways:
  1. As long as you continue to hold down at least one of the keys you used to supply the control algorithm with notes, you can add additional notes by playing them on the keyboard or via MIDI. When no keys are held down, the next note played will replace the notes currently in use.
  2. When you've connected an ENSONIQ SW-10 foot switch to FIZMO and assigned one of its pedals to sustain (see Page 6), you can hold down the pedal and add additional notes to the control algorithm by playing them on the keyboard or via MIDI.

5—Editing, Creating and Saving Presets

As described in *Chapter 1*, when you play FIZMO, you're playing a preset. A preset contains four sounds—any of which can be turned on or off—processed by one of FIZMO's effects. There are two basic aspects, therefore, to editing or creating a whole new preset from an old one:

- Setting up the preset's sounds—the selection and activation of the sounds to be used in the preset, the setting up of sound-layering, and the mapping of sounds across FIZMO's keyboard.
- Setting up the preset's effects—the selection of the type of effect to be used by the preset, and the choosing of the desired variation for the selected effect.

Note: Each preset also contains its own arpeggiator setup and arpeggiator preset—see *Chapter 4*.

When you've programmed the preset to your satisfaction and would FIZMO to remember it, you must save the preset to FIZMO's FLASH memory, as described on Page 20.

The Compare Button and LED

When you make any changes to a preset, FIZMO copies the preset and the changes you've made into a special area of memory called the "Compare buffer." This buffer holds onto your edited preset so that you can compare it to the last-saved version of the preset—the Compare button acts as a toggle switch between the two versions. When you first alter a preset, the LED in the Compare button lights to signify that the preset has been changed (and that the edited preset has been copied to the Compare buffer).

- Press the Compare button once to hear the last-saved version of the preset—the button's LED flashes to indicate that you're now listening to the un-edited version of the preset.
- To return to your edits, press the button again: the LED once again lights solidly, and your edits are heard when you play the keyboard.

Flashing LED: saved preset

Solidly lit LED: edited preset

Tip: Any additional changes you make while listening to the last-saved version of the preset will cause the Compare LED to light solidly, indicating that you are once again listening to the edited version of the preset, with the most recent change added.

Changing, Layering and Mapping a Preset's Sounds

Sounds, Presets and Memory

Each preset contains four memory slots for its sounds. Since there are 64 presets in FIZMO, there are 256 sound memory slots altogether—and 256 sounds. Each of FIZMO's sounds resides in one of the memory slots associated with a preset.

Each of the four slots in a preset has its own button that you can press to turn its sound on—so that it's heard when you play the preset—or off. The LED in each button lets you tell at a glance if its sound is turned on—if the LED is lit or flashing, the sound will be heard when you play the preset.

Sound

1

2

3

4

How Sounds Work in Presets

You can use sounds in a preset in any of three general ways:

- You can use just one of its sounds.
- You can layer up to four of its sounds on top of each other or in different areas of the keyboard.
- You can split up to four of its sounds into convenient pre-mapped octave ranges.

Using a Single Sound in a Preset

To use a single sound in a preset, simply turn on the desired sound. To do this:

1. Press the Sound's button—the button's LED lights solidly and the sound is heard when you play the preset.
2. To switch to another of the preset's sounds, press its button—its LED will light solidly and the newly selected sound will be heard instead of the first sound when you play the preset. The first sound's LED will turn off.
3. To turn off a sound press its button a second time—its LED will go out, and the sound will no longer be heard when you play the preset.

Layering Sounds in a Preset

By layering sounds in a preset, you can accomplish a few different things, depending on each sound's key range, the area of the keyboard in which the sound is programmed to play:

• You can layer sounds that extend the entire range of the keyboard, so that when you play any key, the sounds are heard simultaneously, on top of each other.
• You can layer sounds assigned to different areas of the keyboard in order to set up splits of your own design.
• You can combine both methods to have some sounds play on top of each in certain areas of the keyboard, while other areas of the keyboard play single sounds.

Tip: Use FIZMO's split feature, described on Page 17, to split sounds across the keyboard into factory-programmed key ranges.

To Layer Sounds that Span the Entire Keyboard

1. Press the Sound button for the first sound you want to use in your layering—the LED in the Sound button lights solidly.
2. Double-click the Sound button for the second sound you want to layer—its LED lights solidly, and the first sound's LED flashes.
3. Repeat Step 2 for any additional sounds you want to layer. In each case, the last-activated sound's Sound button LED will light solidly, and LEDs associated with previously layered sounds will flash.
4. To remove a sound from a group of layered sounds, its LED must be solidly lit (not flashing). If the LED for the sound you want to remove is flashing, press its button once. Once its LED is solidly lit, press the button once more to remove it from the group of layered sounds.

To Map and Layer Sounds in Specific Key Ranges

Use each sound's Sound button and FIZMO's keyboard to map the sound to a specific key range:

1. Press and hold down the sound's button.
2. While continuing to hold down the sound's button, press the lowest key of the desired key range, and then the highest key—as you press each key, its name will be displayed ($C4$ is Middle C).
3. Release the Sound button—the sound will only play in the specified area of the keyboard. To change a sound's key range, simply repeat Steps 1-3.

When you let go of each sound's button, FIZMO will automatically layer the sound with any other sounds that are already turned on. Its LED will be solidly lit, and the sound button LEDs for all other active sounds will flash.

Note: It's possible to set up sound key ranges so that no sound is programmed to play in some an area of the keyboard—while harmless, this can be confusing to encounter unexpectedly. If an area of the keyboard produces no sound when you play a preset, use the above method to reset the key ranges of the preset's sounds.

The Split Feature

When different areas of the keyboard play different sounds, the sounds are said to be "split" across the keyboard. While you can set up any kind of four-way split in a preset using FIZMO's Layer feature (described above), FIZMO also provides an easy-to-use automatic Split feature in which each sound plays in a factory-defined area of the FIZMO keyboard. The Split feature prevents the possibility of inadvertently mapping a preset's sounds (see Page 16) so that some areas of the keyboard produce play no sound whatsoever.

When using the Split feature, the preset's four sounds are mapped across the keyboard in the following manner:
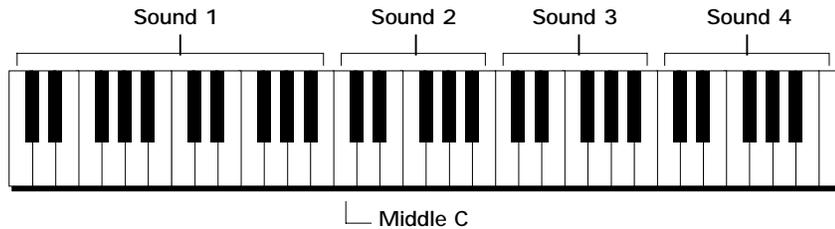
Tip: In a split, Sound 1 is pre-mapped to the lower two octaves on the keyboard, making it perfect for a bass sound. To learn how to select a new sound for the Sound 1 slot, see "Selecting a New Preset Sound" below.

If you use all four sounds in a split, they'll play in the ranges shown above. If you use fewer than four sounds, the Split feature will automatically extend the key range of sounds you use to cover any gaps created by the absence of one of the four possible sounds in the map shown above. It does this according to the following rules:

• The lowest-numbered sound in the split will be extended to the bottom of the keyboard.
• Each sound will extend upward to fill the gap created by the absence of a sound, or sounds, directly above it.

To Create a Split

1. Press and hold down the Sound button associated with any of the sounds you want to use in the split.
2. While continuing to hold Step 1's Sound button down, click, one-by-one, the sound buttons associated with any other sounds you want to include in the split.
3. Release Step 1's button.
4. To remove a sound from the split, its LED must be solidly lit (not flashing). If the sound's LED is flashing, press its button once. Once the LED is solidly lit, press the button once more to remove it from the split.

Selecting a New Preset Sound

In FIZMO's sound-selection and -editing mode, you can assign any of the 256 onboard sounds to any sound slot in the currently selected preset. To enter this mode, press the desired slot's Sound button. When you click a sound's button, its name is shown in FIZMO's display. Each sound is identified by the number of the preset to which it belongs, and by the slot it occupies within the preset.

The preset to which the sound belongs.

The sound's number in the preset

Note: If the display is currently showing a sound name, you're already in sound-selection and -editing mode.
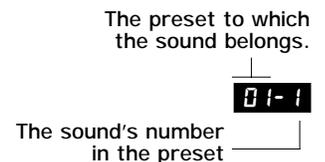
In order to select a new sound for a slot, the LED in its button should be solidly lit (not flashing). If this is not the case, click the desired Sound button once. You can select sounds at any time, whether you've got a single sound turned or a whole group of layered or split sounds.

Press the -/No or +/Yes buttons to select any of FIZMO's onboard sounds, from the current preset or any other. As you select each sound, you can play FIZMO's keyboard to audition it. If you know which preset contains the sound you'd like to use, it's a simple matter to press the -/No or +/Yes button to dial up the preset, and then the sound within the preset.

When you select a new sound, FIZMO copies it into the sound slot—this allows you to edit the sound for use in the current preset without affecting the preset from which it was copied. *Chapter 6* describes editing sounds.

Editing and Setting Up a Preset's Effects

FIZMO contains two powerful effects processors that are always available for the processing of a preset's sounds. Together, these processors provide two types of effects:
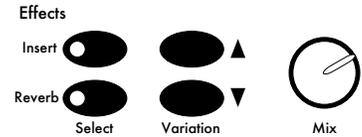
- FIZMO's Insert effects provide a broad range of effect choices, from the conventional—effects such as reverbs, delays and choruses—to the unusual, such as the Chatterbox effect and FIZMO's Vocoder, which is described on Page 19. You can also route a microphone into any insert effect—see "Using FIZMO's Audio Inputs" on Page 5.
- FIZMO's global reverb allows you to adorn any preset's sounds with a natural-sounding ambience.

Each insert effect—and the global reverb—is pre-programmed with a set of variations from which to choose, as described in "To Select an Insert Effect or Global Reverb Variation" on Page 19.

For each preset, you can select an insert effect and variation and a global reverb variation through which the preset's sounds will be processed. You can also set the overall wet/dry—or un-effect sound/processed sound—balance for the preset's insert effect and global reverb.

Note: Each sound in a preset is comprised of two components called "oscillators," both of which can be individually routed to the preset's insert effect or global reverb, or left un-effected, or "dry." See Page 30.

Choosing an Insert Effect

1. Press the Effects Select Insert button.
2. Press the -/No or +/Yes button to select the desired insert effect from the list of 41 insert effects below. You can try out any insert effect before deciding which one you want to use.
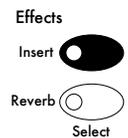
Insert Effect:	Displayed as:	Insert Effect:	Displayed as:
Parametric EQ	PArA	DDL > Phaser	dPhA
Hall Reverb	HALL	DDL > EQ	dE9
Large Room	Lroo	Multi-tap DDL	tAP
Small Room	Sroo	Distortion > Chorus	dStC
Large Plate	LPLt	Distortion > Flanger	dStF
Small Plate	SPLt	Distortion > Phaser	dStP
Non Linear Reverb 1	nLr1	Distortion > Autowah	dCrY
Non Linear Reverb 2	nLr2	ResVCF > DDL	rESd
Gated Reverb	GAtE	Dist > VCF > DDL	drES
Stereo Chorus	Cho	Pitch Detune	Pitc
8 Voice Chorus	8Cho	Chatter Box	CHAt
Reverb > Chorus	rCho	Formant Morph	ForF
Reverb > Flanger	rFLG	Rotary Speaker	rotS
Reverb > Phaser	rPHS	Tunable Speaker	tunE
Chorus > Reverb	Chor	Guitar Amp	Gutr
Flanger > Reverb	FLGr	Dist > DDL > Tremolo	trLo
Phaser > Reverb	PHSr	Comp > DDL > Tremolo	cdSt
EQ > Reverb	E9r	EQ > Comp > Gate	9CGt
Spinner > Reverb	SPin	EQ Cho DDL	9Chd
DDL > Chorus	dCho	Vocoder	Codr
DDL > Flanger	dFLG		

Note: FIZMO requires a few milliseconds to install a just-selected insert effect.

Using the Vocoder Insert Effect

FIZMO's vocoder insert effect allows you to shape sounds using your mouth by speaking or singing into a microphone connect to FIZMO's rear-panel Audio Input jack.

Tip: To learn how to connect a microphone and set its level, see "Using FIZMO's Audio Inputs" on Page 5.

Once you've connected the microphone and set its level, select the vocoder insert effect and play some keys on FIZMO's keyboard while speaking or singing into the microphone—FIZMO will shape the preset's sounds to mimic the shapes your mouth makes, forming words constructed from music.

Note: While you can sing into your microphone while using the vocoder insert effect, the pitch of FIZMO's notes will reflect what you play on the keyboard (or via MIDI), not what you sing.

To Select an Insert Effect or Global Reverb Variation

Each insert effect and the global reverb has a collection of useful—and sometimes exciting—pre-programmed variations from which you can choose to find the best one for the preset you're working on. Variations are selected using the up-and-down-arrow Variation buttons.

To select a variation for a preset's insert effect:

1. Press the Effects Select Insert button so that its LED is lit (if it's already lit, skip to Step 2.)
2. Use the Variation buttons to select from among the insert effect's variations, displayed as "υ0 1," "υ02" and so on. You can try out each of the variations before deciding on the one you want to use.
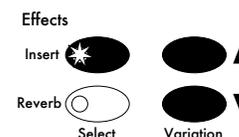
To select a global reverb variation for a preset:

1. Press the Effects Select Reverb button so that its LED is lit (if it's already lit, skip to Step 2.)
2. Use the Variation buttons to select from among the global reverb's variations. You can try out each of the variations before deciding on the one you want to use.
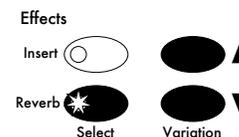
The global reverb variations are:

Variation:	Displayed as:
Preset—the variation contained in the saved version of the preset	PSEt
Smooth Plate	r0 1
Large Hall	r02
Small Hall	r03
Big Room	r04
Small Room	r05
Reflections	r06
Bright	r07
Huge Place	r08

Adjusting an Effect's Wet/Dry Mix

When using an effects processor—such as the those in FIZMO—the word "wet" describes sound that has been subjected to effect processing, while the word "dry" refers to sound that has not. FIZMO's Mix knob allows you to adjust the balance between a preset's sounds as they're heard prior to processing and their processed versions. This can be useful when you want to add processing to preset sounds without letting the effect overwhelm their original characteristics—at other times, you may well want to hear only the effected versions.

Note: FIZMO's three global reverb effect busses allow you to apply a light, average or heavy amount of global reverb to each oscillator that comprises a preset's sounds, as described on Page 30. The Mix knob allows you to adjust the overall volume of the global reverb while retaining these three different relative amounts of reverb.

To adjust the wet/dry mix for a preset's insert effect:

1. Press the Effects Select Insert button so that its LED is lit (if it's already lit, skip to Step 2.)

2. Turn the Mix knob to achieve the desired wet/dry balance.
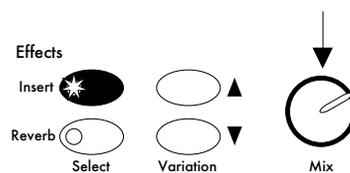
To adjust the wet/dry mix for a preset's global reverb:

1. Press the Effects Select Reverb button so that its LED is lit (if it's already lit, skip to Step 2.)
2. Turn the Mix knob to achieve the desired wet/dry balance.
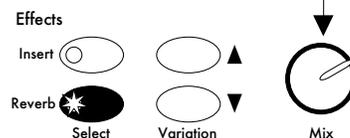
Tip: The Mix knob is always active for the effect whose LED is lit, so it can be used as a realtime control for that depth of that effect.

Saving a Preset

If you'd like FIZMO to retain the edits you've made to a preset or a new preset you've created, you'll need to save it to FIZMO's FLASH memory. When you save a preset, all of its sounds are saved as well, to the four sound memory locations associated with the preset. In addition, FIZMO will also save the current state of the arpeggiator—described in *Chapter 4*—as part of the preset, including whether it's turned on or off at the time the preset is saved.

To save a preset:

1. Press the Save button. Its LED will begin to flash, and the preset you've edited—or the preset you started with to construct a new one—will be displayed.
    FIZMO is packed with presets when it's shipped from the factory, so there are no preset memory locations that don't already contain a preset. When you save a new preset, therefore, the new preset must always replace an older one. You can select the preset whose memory location you want to use—this will cause the preset currently in that location to be erased, replaced by the preset you're saving.
2. If you'd like to replace a different preset than the one currently being displayed, use the -/No or +/Yes buttons to select the desired preset.
3. When you've selected the preset whose memory location you want to use for your new preset, press the Save button a second time. The word "ʙᴜʀɴ" will be displayed as the preset is burned into the selected location in FIZMO's FLASH memory.

Tip: To learn more about FIZMO's memory, including FLASH, see Page 3.

Tip: You can also store FIZMO presets in an external MIDI storage device. See Page 33.

Tip: To learn how to restore FIZMO's factory presets, see Page 41.

6—Programming Sounds

Understanding FIZMO Sounds

This chapter describes the editing, or programming, of FIZMO sounds using the sound-related knobs and buttons grouped together on FIZMO's front panel. Before beginning to tweak or create new sounds, take a moment to familiarize yourself with what exactly makes up each of the sounds in a FIZMO preset.
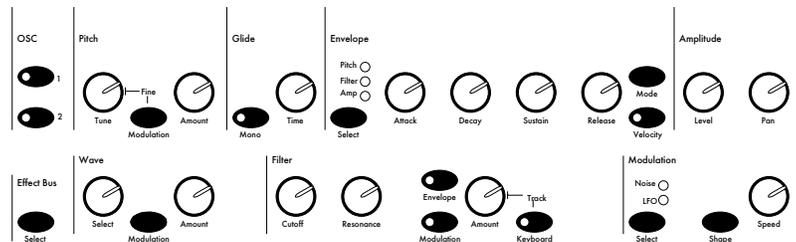
Note: Experienced synthesists will recognize FIZMO's familiar sound-programming tools.

Two Oscillators Equals One Sound

The oscillator is the basic building block of a FIZMO sound. An oscillator is a structure that plays one of the waves—sound recordings—stored in FIZMO, and contains settings that allow you to shape the sound of the wave, and to send it to one of FIZMO's effects. Each sound has two oscillators—you can use either in a sound, or both. When you program a sound, what you're doing is telling its oscillators if, what and how to play.

Tip: The programming changes you make are instantly heard (except as noted). This makes the oscillator programming buttons and knob realtime controls for the oscillator being edited.

The Flow of an Oscillator

It can be helpful when programming an oscillator to understand how its sound flows from the basic wave all the way to FIZMO's outputs—this is called the oscillator's "signal flow." As you can see, the journey begins at the wave and travels through pitch, glide, filter and amplitude controls before being sent to one of its preset's effects.

Controls the pitch at which the wave plays.

Controls frequency content

One of the preset's effects.

Wave → Pitch → Glide → Filter → Amplitude → Effect → FIZMO's stereo outputs

Controls the wave the oscillator plays.

Controls how the oscillator moves from note to note

Controls volume and stereo panning.
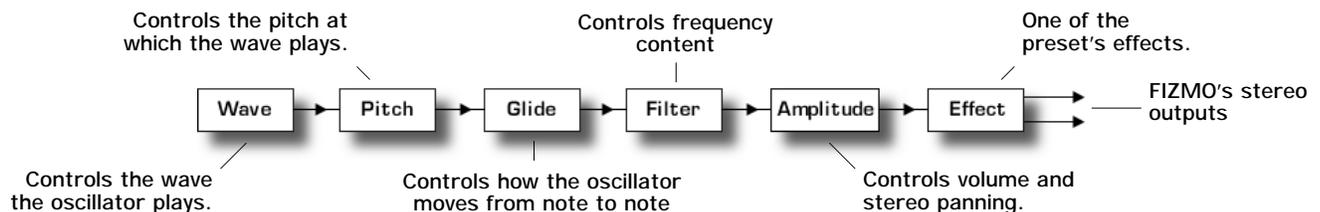
Note: The structure of this chapter, from "Wave" forward, reflects the above signal flow. Most of the section headings in the chapter follow the labeling of sections of FIZMO's front panel.

Modulation

Much of the art in programming comes from the creative application of modulation. Modulation—a technical word for "change"—alters an oscillator setting as you play. This can bring oscillators to life by allowing them to change shape as you listen, and provide for greater sonic complexity. Various oscillator settings in FIZMO can be modulated by any of its collection of modulators, as noted throughout this chapter. In each case, the modulator raises and/or lowers the setting's initial value. Modulation is applied to a setting by:

1. manually establishing the setting's initial value.
2. selecting a modulator by repeatedly clicking the setting's Modulation button until the desired modulator is displayed. If you prefer, you can click the Modulation button once and use the -/No or +/Yes button to select the desired modulator.
3. setting the amount of modulation to be applied by turning the setting's Amount knob. The amount of modulation is shown in FIZMO's display as a positive or negative number—negative numbers being those preceded by a minus sign. The effect of a positive or negative modulation value depends on the selected modulator, as described in the chart that follows.

Modulation

Amount

Modulator:	Displayed as:	What it does to a setting's initial value:
OFF	OFF	Nothing—modulation of the setting is turned off.
FULL	FULL	The corresponding modulation Amount knob resets it to a value corresponding to the Amount value, allowing you to sweep it in realtime by turning the Amount knob.
LFO	LFO	With a positive Amount value, it's moved upward as the oscillator's LFO's wave moves above its zero crossing and downward as it moves beneath (Page 24). With a negative Amount, the opposite occurs.
Stepped noise	noi 5	With a positive Amount value, it's moved upward in large random steps as the oscillator's noise generator goes up in level and downward as it goes down (Page 24). With a negative Amount, the opposite occurs.
Low-pass-filtered, or smooth, noise	LPF	With a positive Amount value, it's moved upward in small increments as the oscillator's noise generator goes up smoothly in level and downward as it goes down (Page 24). With a negative Amount, the opposite occurs.
Envelope 1	En 1	With a positive Amount value, it's raised, with the value changing over time according to the shape of the selected envelope. With a negative Amount, the envelope's shape is inverted, lowering the setting's value.
Envelope 2	En2	
Envelope 3	En3	
Velocity	tch	With a positive Amount value, it's raised by harder keystrokes on FIZMO's keyboard; with a negative Amount, it's lowered by harder keystrokes.
Velocity and pressure	tPr5	With a positive Amount value, it's raised by harder keystrokes and the pressing down of keys on the keyboard; with a negative Amount, the opposite occurs.
MIDI Note	notE	With a positive Amount value, received MIDI notes set it to the corresponding absolute value. With a negative Amount, sets it to the MIDI note's mirror image.
Keyboard	brd	With a positive Amount value, notes played higher than Middle C raise it, and notes below Middle C lower it; with a negative Amount, the opposite occurs.
Pressure	Pr5	With a positive Amount value, it's raised when you press down on a key; with a negative amount, the opposite occurs.
Pitch wheel	Ptch	With a positive Amount value, it's raised when you push the pitch bend wheel forward from its center position, and lowered when you pull it back from this position; with a negative Amount, the opposite occurs.
Modulation wheel	CtL 1	With a positive Amount value, it's raised when you push the modulation wheel forward; with a negative Amount, its lowered when you push the wheel forward.
Modulation wheel and pressure	CtPr	With a positive Amount value, it's raised when you push the modulation wheel forward or press down on a key; with a negative Amount, the opposite occurs.
Foot switch	Foot	With a positive Amount value, it's raised when MIDI Foot Pedal (Controller #4) data is received via MIDI; with a negative Amount, it's lowered.
Sustain pedal	Su5t	With a positive Amount value, pressing a sustain pedal (Page 6) sets it to its highest value; with a negative Amount, a pedal-press sets it to its lowest value.
Sostenuto pedal	SO5t	With a positive Amount value, pressing a sostenuto pedal (Page 6) sets it to its highest value; with a negative Amount, a pedal-press sets it to its lowest.
System Controller 1	5Y5 1	With a positive Amount value, the selected system controller (Page 34) raises it; with a negative Amount, the system controller lowers it.
System Controller 2	5Y52	
System Controller 3	5Y53	**Note:** When modulating a setting on FIZMO itself, System Controller 3 is the "F" FIZMO knob and System Controller 4 is the "O" FIZMO knob; when transmitting or receiving MIDI data, they are the designated MIDI controllers (see Page 34).
System Controller 4	5Y54	
Patch Selects	PSEL	With a positive Amount value, received MIDI Patch Select messages from a left Patch Select button raises it by 1/4 its full value, a right Patch Select button by 1/2 its full value, and both buttons to its full value. With a negative Amount, its value is lowered by the above amounts.
Global LFO	GLFO	With a positive Amount value, it's moved upward as the system-wide Global LFO's wave moves above its zero crossing and downward as it moves beneath. With a negative Amount, the opposite occurs. Global LFO is optimized for producing vibrato when the modulation wheel is pushed forward.

Note: In cases where a corresponding MIDI message exists for a modulator, modulation can be applied by received MIDI data.

Note: When you change modulators, effect of the change will not be heard until the next played note.

Envelope

An envelope is a special type of modulator that brings together level and time settings to describe a shape that can be used for a variety of programming purposes. The power of envelopes lies in their dynamism—an envelope's shape affects a setting over a period of time starting from the moment a note begins playing. As with any modulator, the envelope affects the setting's initial value. For easy editing, FIZMO's front panel presents its envelopes using a traditional ADSR structure—"ADSR" stands for "Attack, Decay, Sustain, Release," the four settings with which you construct the envelope's shape:
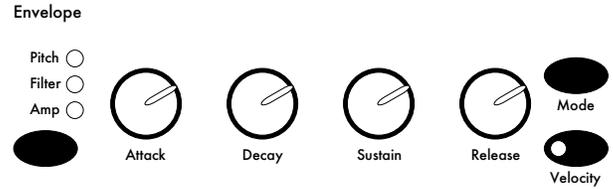
• Attack—as a note starts playing, Attack sets the amount of time it takes for the enveloped setting to move from its initial value to its highest value.
• Decay—sets how long the setting will remain at its highest value before moving to its Sustain value.
• Sustain—the value at which the setting will remain after its Attack and Decay stages, for long as the note continues to be played.
• Release—sets how long it will take the setting to return to its lowest value when you stop playing the note.
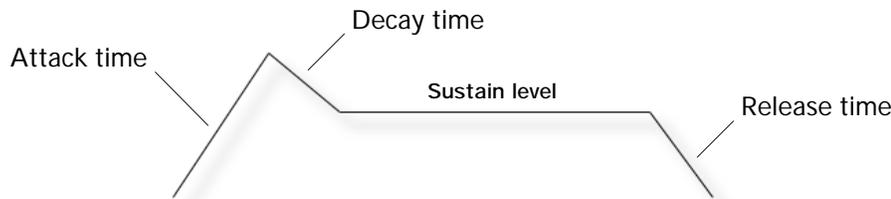
Note: Under its hood, FIZMO's envelopes are actually complex 5-stage envelopes with five time and four level settings and are programmed using computer editing software. When edited from FIZMO's front panel, envelopes are forced into an ADSR-compliant shape, and their characteristics may therefore dramatically change.

There are three envelopes available to each oscillator in FIZMO, and each typically handles one important task:

• Envelope 1 is usually assigned the oscillator's Pitch Tune setting, allowing you to raise and shape its pitch (see Page 27). To do this, select Envelope 1 as the modulator in the Pitch section of FIZMO's front panel.
• Envelope 2 is connected to the oscillator's Filter Cutoff setting, allowing you to raise and shape its frequency content (see Page 28). You can set the amount of enveloping to be applied to the filter with the Envelope button in the Filter section of FIZMO's front panel.
• Envelope 3 allows you to control the shaping of the oscillator's volume, or "amplitude"—it's connected to the oscillator's Amplitude Level setting Page 29).

In addition, each envelope can modulate any setting to which modulation can be applied—see Page 21.

Tip: To negatively apply an envelope—so that it lowers a setting's initial value—to an oscillator's Pitch Tune or Filter Cutoff settings, apply the envelope as a modulator with a negative amount.

Programming FIZMO Envelopes

Use the controls in FIZMO's front-panel Envelope section to program any of its three envelopes. Press one of the three buttons beneath the "Envelope" label to select the envelope you wish to program. To program:

• Envelope 1, press the Pitch button.
• Envelope 2, press the Filter button.
• Envelope 3, press the Amp (for "Amplitude") button.

Note: Changes made to an envelope are not heard in notes that have already begun playing.

To Set an Envelope's Shape

Once you've selected the envelope you want to program, you turn the Attack, Decay, Sustain and Release knobs to set their values to the desired setting for the selected envelope.
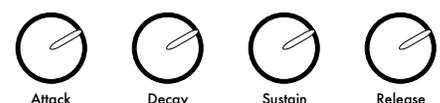
Envelope Modes

Each envelope can operate in any of the three modes that determine how and when it will travel through its Attack, Decay and Release stages:

Mode:	Displayed as:	When this mode is selected, the envelope:
Normal	nor	behaves normally. The envelope begins when you play a note, and when you stop playing the note, the setting it's shaping moves from its current value back to its initial value at the speed set with the Release setting.
Finish	Fin	moves through all of its stages. The envelope begins when you play a note, and ignores when you stop playing the note, running through all of its stages as programmed. Finish mode can be especially useful for programming a percussive hit to play all the way through when you play and quickly release a note on the keyboard.
Repeat	rPt	moves through all of its stages, over and over. The envelope begins when you press a key on the keyboard, and as you continue to hold down the key, the envelope runs through all of its stages, again and again until you let go of the key. Repeat mode is useful in the creation of trilling notes.

To set the currently selected envelope's mode, tap the Envelope Mode button until the desired mode is displayed.

Mode

Envelopes and Velocity

You can make an envelope more "playable" by programming it to respond to velocity. When it does so, the envelope only pushes the setting it's shaping to the maximum programmed value with the hardest of keystrikes on the keyboard. Softer keystrikes will apply the envelope's shape to the setting to lesser degrees. To activate the currently selected envelope's response to velocity, tap the Envelope Velocity button until its LED lights.

Velocity

LFO and Noise

FIZMO provides each oscillator its own LFO and noise generator. These modulators supply two constantly changing forms of modulation:

- The LFO—for "Low Frequency Oscillator"—is an oscillator that produces a low-frequency wave that's not heard directly but which can be applied as a regular, repetitive modulator to an oscillator's settings. Waves, by nature, cycle between high and low amplitudes as they play. As the LFO's wave goes up in amplitude, it pushes the value of the setting being modulated higher. As its amplitude decreases, it pushes the setting downward. The LFO is useful for creating vibrato and other repetitive effects.
- Noise is a random-value generator that moves the setting being modulated up or down by unpredictable amounts. Noise can be applied in "stepped" or "smooth" form: stepped noise changes the setting's value in radical, extreme jumps, while smooth noise changes the settings by smaller, subtler amounts. When selecting a modulator, stepped noise is displayed as "noi 5," and smooth noise is displayed as "LPF" (for "low-pass-filtered noise").

Note: A separate system-wide LFO, called the Global LFO, is also available as a modulator (see the chart on Page 22. The Global LFO is optimized for the creation of vibrato.

Programming an Oscillator's LFO and Noise

Modulation

Noise ○
LFO ○

The Modulation section of FIZMO's front panel allows you to customize an oscillator's LFO and noise modulators. To edit an oscillator's:

- LFO, tap the Modulation Select button until the LFO LED lights.
- noise, tap the Modulation Select button until the Noise LED lights.

Select   Shape   Speed

Setting the LFO Wave's Shape

The type of modulation produced by an LFO depends on the shape of its wave, since the shape sets the slope at which the modulated setting rises and falls. Tap the Modulation Select button until the LFO LED is lit and then tap the Modulation Shape button to program the LFO to produce any of the following shapes:

Shape

Wave shape:	Displayed as:	Character:
Triangle	tri	a triangle-shaped wave; commonly used to modulate pitch for the production of vibrato
Sine + Triangle	Stri	a somewhat rounded triangle wave
Sine	Sin	a rounded, pure fundamental wave
Rising triangle	rtri	a positive-going-only triangle wave that rises and falls back to the setting's initial value; useful for simulating vibrato on stringed instruments such as a guitar where a player can only bend notes upward when creating vibrato
Rising sine	rSin	a positive-going-only sine wave that rises and falls back to the setting's initial value; useful for simulating vibrato on stringed instruments such as a guitar where a player can only bend notes upward when creating vibrato
Sawtooth	Sau	a jagged wave commonly used for special effects
Square	Sqr	a positive-going-only square wave useful for creating trilling effects
Positive ramp	dEcr	a positive-going-only decrementing ramp that starts at its peak level and falls back to the setting's initial value

Tip: Once you've tapped the Modulation Shape button once, you can use the -/No or +/Yes button to select an LFO shape.

Note: The shape of the noise modulator is by definition irregular and cannot be set using the Shape button.

Setting the Speed of an Oscillator's LFO or Noise

An LFO can produce its cyclical modulation—and noise its random modulation—at different speeds, causing the modulated setting's value to change slowly or rapidly. In addition, both modulators can be synchronized with FIZMO's system clock (Page 13) so that their modulation speeds correspond rhythmically with the arpeggiator or with received MIDI clocks. FIZMO allows you to set the speed of an oscillator's LFO or noise by:

1. tapping the Modulation Select button until the desired LED—LFO or Noise—is lit.
2. turning the Modulation Speed knob to select the desired value.

Speed

You can set the speed of an LFO or noise to:

Value:	Displayed as:	The LFO or noise will modulate settings at:
Thirty-second note	32nd	a thirty-second note rate based on the system tempo
Sixteenth-note triplet	16t3	a sixteenth-note triplet rate based on the system tempo
Sixteenth note	16th	a sixteenth note rate based on the system tempo
Eighth-note triplet	8th3	an eighth-note triplet rate based on the system tempo
Eighth note	8th	an eighth note rate based on the system tempo
Quarter-note triplet	qtr3	a quarter-note triplet rate based on the system tempo
Quarter note	qtr	a quarter note rate based on the system tempo
Half-note triplet	HLF3	a half-note triplet rate based on the system tempo
Half note	HALF	a half note rate based on the system tempo
Whole-note triplet	HOL3	a whole-note triplet rate based on the system tempo
Whole note	HOLE	a whole note rate based on the system tempo
0-99	0-99	the selected absolute speed value, with higher numbers representing greater speeds

Sound

Selecting a Sound for Programming

Before you can program a sound's oscillators, you must select the desired sound. To do this:

1. Press the desired sound's Sound button—its LED will light solidly.

OSC
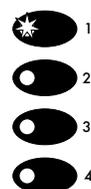
OSC

Turning Oscillators On and Off

In order for an oscillator to be heard, it must be turned on (its sound must be turned on, too; see Page 16). The OSC 1 and OSC 2 buttons correspond to the selected sound's first and second oscillators, respectively. The LEDs in the OSC 1 and OSC 2 buttons tell you if either oscillator is turned on—if an oscillator is on, its LED is lit or flashing. To turn a sound's oscillators on off:

1. Press the desired oscillators' OSC button—its LED will light, and the oscillator will be heard when you play the preset.
2. To turn on the sound's other oscillator, double-click its OSC button—its LED will light, and the previously activated oscillator's LED will begin to flash. Both oscillators will now be heard when you play the preset.
3. To turn off an oscillator, the LED in its button must be solidly lit. If the LED corresponding to the oscillator you want to silence is flashing, press its OSC button. To turn off the oscillator, press its OSC button again.

Selecting an Oscillator for Programming

FIZMO's oscillator-programming buttons and knobs affect the oscillator whose OSC button LED is solidly lit. If the OSC-button LED corresponding to the oscillator you want to program is flashing or unlit, press the button to select the oscillator for editing.

Tip: You can select both oscillators at once in order to simultaneously edit their settings. To do this, press both OSC buttons at the same time—this display will show *both*. When you adjust the value of a setting, both oscillators will be set to the selected value.

Wave

Wave

What is a Wave?

Each oscillator plays one of the sound recordings—or "waves"—stored in FIZMO's memory. A wave is an oscillator's raw sonic material. FIZMO contains three types of waves:

Select   Modulation   Amount

- Sawtooth and square waves provide the building blocks for constructing vintage synth textures. Each is a single recording of a classic synth waveform that plays continuously, looping from start to end over and over again as you hold down a key.
- The FIZDRUMS wave offers a collection of drum sounds spread out over the entire range of the keyboard. Each time you strike a key, the corresponding drum sound plays once and then stops.
- ENSONIQ's exclusive Transwaves provide the foundation of FIZMO's unique sound. These special waves consist of multiple related or unrelated recordings strung together into a single entity. FIZMO allows you to program the portions of a Transwave to be played when you strike, and as you hold, a key.
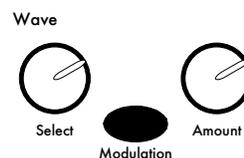
What is a Transwave?

Transwaves, first introduced in ENSONIQ's VFX synthesizer, are special waves comprised of multiple sound recordings arranged one after another in "frames." Transwaves can provide an exciting degree of animation, or liveness, to sounds. The recordings in a Transwave may be related to one another—with each frame capturing a stage in the evolution of a single sound—or they may be unrelated, resulting in a random-sounding wave that can be useful in providing a touch of the unexpected to a sound. You can use modulation to control which frames will be heard when you play a note, resulting in all manner of dynamic timbral changes.

Wave

Select

Selecting an Oscillator's Wave

To select an oscillator's wave, turn the Wave Select knob to select the desired wave by its number:

	Synth and Drum Waves	19	TINE XWAVE	39	GREEN TRANCE
1	SAWTOOTH	20	REZ POP ATAKS	40	YELLOW TRANCE
2	SQUARE WAVE	21	VOWELS	41	COLOR WHEEL
3	FIZDRUMS	22	SYLLABLES	42	1K TEST SINE
	Transwaves	23	VODER-X	43	TRAN-REZ BASS
4	LONG GONG 2	24	TRANSWAVE AA	44	ANA BS XWAVE
5	CHIME-X	25	TRANSWAVE AH	45	TRANZGRUV 09
6	MIRROR-X	26	TRANSWAVE EE	46	TRANZGRUV 10
7	SPARKLERS	27	TRANSWAVE OO	47	STEPS
8	TUBULAR-X	28	HARMONIX	48	CLAVINEX
9	BELL XWAVE 3	29	BASS REZ 2	49	TRANZGRUV 02
10	BELL XWAVE 4	30	CYBORG	50	U B RANDOM
11	MULTI BELL	31	TRANS E.PIANO	51	STEP UP
12	REZ LOOPS-2	32	FRANKENWAVE	52	REZ SQUARE
13	FAT SQUAREZ	33	TRANZGRUV 04	53	GET EVEN
14	SAW REZ SWEEP	34	LIGHT YEARS	54	POLYMOD SWEEP
15	TRANS BOY	35	TRANZGRUV 05	55	ANALOG PAD X
16	QUITE ODD	36	RAT BREATH X	56	ORGAN XWAVE
17	STEPS REZ	37	PULSEWAVEMOD	57	TRI SWEEP
18	REZ SWEEP	38	SAMPLE & HOLD	58	BRAINIAC

Tip: Once you've turned the Wave Select knob, you can also use the -/No or +/Yes button to select waves.

Modulating a Wave

You can modulate the portion of the wave to be heard when you play a note. With no modulation, a wave plays from the beginning. With positive modulation, the wave plays from a location somewhere after its beginning.

Tip: Negative wave modulation causes the wave to play closer to its beginning; this can be useful when a wave has been programmed—using computer editing software—to start playing somewhere in the middle.

To modulate an oscillator's wave:

1. Tap the Wave Modulation button to select the desired modulator (see Page 22).
2. Turn the Wave Amount knob to set the desired modulation amount.
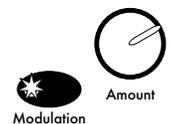
Amount

Modulation

Tip: When using a Transwave, selecting the FULL modulator allows you to select the frames that will be heard when you play a note. Turn the modulation Amount knob to select the desired frame; you can "sweep" the Transwave's frames by turning the knob as a note plays.

Pitch

Setting an Oscillator's Tuning

Each oscillator will, by default, play the pitch corresponding to the key you play on the keyboard. To change this, turn the Pitch Tune knob to select the number of semitones by which you want to shift the oscillator's pitch upward or downward, shown on the display as numbers and negative numbers, respectively.

Pitch

Fine

Tune   Amount
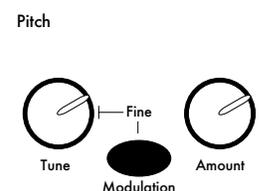
Modulation

Tip: To change the tuning of an oscillator in fine increments, press and hold down the Pitch Modulation button, and while continuing to hold the button, turn the Tuning knob—the display will show the number of cents by which you're re-tuning the oscillator as a number, or negative number, followed by a "*c*."

Tip: Once you've turned the Pitch Tune knob, you can also use the -/No or +/Yes button to set tuning.

Note: You can alter FIZMO's overall tuning using its *tunE* setting. See Page 34. This system-wide *tunE* setting applies to all of the oscillators in all of FIZMO's sounds and presets.

Modulating an Oscillator's Tuning

To modulate an oscillator's tuning:

1. Tap the Wave Modulation button to select the desired modulator (see Page 22).
2. Turn the Pitch Amount knob to set the desired modulation amount.
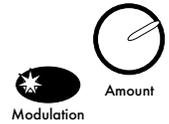
Tip: When you want to use an envelope for the modulation of an oscillator's pitch, we recommend using Envelope 1—though not mandatory, this envelope is typically used for this purpose. It's pre-labeled "Pitch" in the Envelope area of FIZMO's front panel for your convenience.

Pitch and the Oscillator LFO

Each oscillator's LFO (Page 24) is always routed to its pitch. To adjust the amount of LFO applied to the pitch, or to turn it off altogether when you want to use the LFO for purposes other than pitch modulation, hold down the Pitch Modulation button and turn its Amount knob.
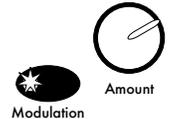
Glide

The Glide controls allow you to program the number of notes that the oscillator can play at once and set the manner in which the oscillator's notes move from one to the next:

- When the Glide mono mode is turned on, the oscillator always plays a single note at a time. When mono mode is off, FIZMO's standard 48-oscillator polyphony allows you to play single-note lines or chords.
- You can program the oscillator to glide from the pitch of one note to the pitch of the next, and set the speed of this transition using the Glide Time knob.
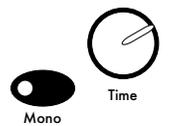
Tip: When you hold down more than one note in mono mode, FIZMO plays the last-played note. If you let go of the note, FIZMO will play the lowest note currently being held.

Note: In mono mode, while more than one note is held down, the oscillator's envelopes do not restart with each new keystrike in order to allow you to use the Glide Time knob to program a seamless glide from note to note.

To activate mono mode, tap the Glide Mono button to light its LED.

To program the oscillator to glide from one note to the next, turn the Glide Time knob to set the speed of the note-to-note transition—from *0* to *99*—or select *OFF* for no gliding between notes. Once you've turned the knob, you can also use the -/No or +/Yes button to set the glide time.

Filter

Each oscillator has its own low-pass resonant four-pole filter with which you can set the high-frequency content of the oscillator's wave. A low-pass filter allows all frequencies of a wave that fall beneath a specified frequency—called the "cutoff frequency"—to be heard. An oscillator's cutoff setting is given shape by Envelope 2 and may also be modulated by any of FIZMO's modulators. You can also apply "resonance," or "Q," a popular whistle-like vintage synth effect.
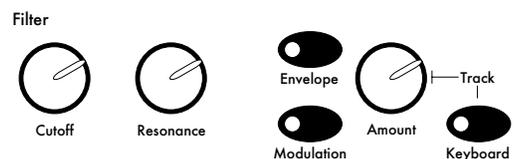
To Set a Filter's Cutoff Frequency

To set an oscillator filter's cutoff frequency, turn the Filter Cutoff knob. The range of the knob is from *l2l*—where all of the wave's frequencies are allowed to pass, since they all fall beneath the cutoff frequency—to *0*, where the no frequencies are lower than the cutoff setting, and the wave is therefore silenced. For a bright sound, set the cutoff to a higher value, and vice versa.

To Apply Resonance to an Oscillator's Filter

Resonance occurs when you increase the volume of a filter's cutoff frequency. To do this, turn the Filter Resonance knob to select a value from *0* to *49*, representing the amount by which you're increasing the cutoff frequency's volume. (Once you've turned the Filter Resonance knob, you can also use the -/No or +/Yes button to set the amount of resonance.)

Note: When you change a filter's resonance setting, the change is not heard until the next played note.

Programming Filter Enveloping

In each oscillator, Envelope 2 is pre-assigned the task of changing the cutoff setting by a prescribed amount over a specified period of time. This allows the brightness of the oscillator's note to change as it plays, allowing for the creation of interesting effects and realistic simulations of real-world sounds.

To Set the Amount of Enveloping

1. Press the Filter Envelope button so that its LED lights.
2. Turn the Filter Amount knob—or use the -/No or +/Yes button—to set the degree of enveloping. The display shows a possible range of from *0* to *l2l*.

Programming the Filter Cutoff to Track FIZMO's Keyboard

You can program the cutoff setting so that it tracks FIZMO's keyboard—as you play higher-pitched notes, the sound gets brighter, as in real-world instruments.

1. Press and hold down the Filter Keyboard button.
2. While continuing to press the Keyboard button, turn the Filter Amount knob to set the degree of keyboard tracking, from *-l6* to *l6*. Positive values cause the cutoff value to rise when higher notes are played, and lower when lower notes are played. Negative values invert the keyboard tracking, so that higher notes reduce the cutoff's value, and lower notes raise it.
3. To turn off tracking, press the Filter Keyboard button again.
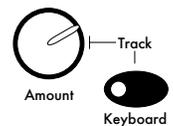
Tip: Once you've turned the Filter Amount knob, you can also use the -/No or +/Yes button to set tracking.

Modulating the Filter Cutoff

To modulate a filter's cutoff setting, tap the Filter Modulation button to select the desired modulator (see Page 22), and turn the Filter Amount knob to set the modulation amount.
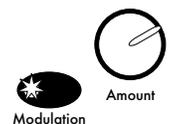
Amplitude

The Amplitude section of FIZMO's front panel contains controls for setting the oscillator's volume and stereo panning.

Setting an Oscillator's Volume

To set the oscillator's volume, turn the Amplitude Level knob. You can set an oscillator's volume anywhere from *-30* to *l4*. Negative values decrease the oscillator's volume, while non-signed values increase it; a value of *0* leaves the oscillator's volume unchanged.
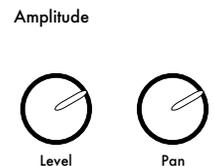
Tip: Once you've turned the Amplitude Level knob, you can also use the -/No or +/Yes button to set the oscillator's volume.

Tip: Envelope 3 is pre-assigned to the oscillator's level setting, allowing you to program volume changes that occur over a period of time, and to set the oscillator's decay time.

Setting an Oscillator's Stereo Position

To set the position of an oscillator in the stereo field, turn the Amplitude Pan knob. This knob has a range of - **63**, for panning the oscillator far left, to **63**, for panning it far right. A value of **0** centers the oscillator.

Pan

Tip: Once you've turned the Amplitude Pan knob, you can also use the -/No or +/Yes button to set the oscillator's stereo position.

Effect Bus

Selecting an Oscillator's Effect Bus

To apply a preset's insert effect or global reverb to an oscillator, you must first assign the oscillator to the appropriate effect bus—an effect bus is a conduit through which the oscillator's sound travels to reach the preset's effects. Since global reverb is such a frequently used effect, three effect busses are provided to allow you to choose the amount of reverb to be applied to the oscillator. There are four possible effect busses overall from which to choose:

- the insert bus (displayed as "**inS**")—Select the insert bus when you intend to apply the preset's insert effect to the oscillator.
- global reverb bus 1 ("**r1**")—Select the **r1** bus to apply a just a touch of global reverb to the oscillator.
- global reverb bus 2 ("**r2**")— Select the **r2** bus to apply an average amount of global reverb to the oscillator.
- global reverb bus 3 ("**r3**")—Select the **r3** bus to apply a large amount of global reverb to the oscillator.
- the dry bus ("**dry**")—The dry bus actually doesn't send the oscillator to an effect at all: it sends it to FIZMO's outputs un-effected, or "dry."

Tip: To learn more about FIZMO's effects, see Page 18.

Note: When you change an oscillator's effect-bus assignment, the change is not heard until the next played note.

Note: FIZMO's Effects section provides a Mix knob that you can use to set an insert effect's wet/dry, or processed sound/un-processed sound, balance. It also allows you to set an overall global reverb level while retaining the differences in the relative amounts of reverb being applied by the **r1**, **r2** or **r3** effect busses.

To Select an Oscillator's Effect Bus

Effect Bus

1. Tap the Effect Bus Select button until the desired bus is displayed. Once you've tapped the Effect Bus Select button, you can also use the -/No or +/Yes button to assign the oscillator to the desired bus.

Select

7—MIDI

FIZMO is a six-channel MIDI device that allows you to direct MIDI data to its presets, sounds and arpeggiator, and lets you transmit MIDI data from its keyboard and arpeggiator to any external MIDI device. This lets you to record from FIZMO's keyboard—or the arpeggiator—into a MIDI sequencer, or to play an external MIDI device using FIZMO's keyboard. The F-I-Z-M-O knobs, pitch bend and modulation also transmit MIDI data. In addition, its arpeggiator—as well as LFOs, noise and effects—can be synchronized to any external MIDI timing source that can transmit MIDI clocks. (For a beginner's look at MIDI, see Page 42.)

Note: Successful MIDI operations depend on the proper connection of FIZMO to your other MIDI devices. See Page 7 for details.

Note: Technical documentation of FIZMO's MIDI capabilities can be found at the end of this chapter.

Receiving MIDI

FIZMO can direct incoming MIDI data to up to six internal areas, each of which uses its own MIDI channel—this allows you to play up to six separate melodies or chords in FIZMO via MIDI, and/or to direct MIDI notes to its arpeggiator. Any six consecutive MIDI channels can be used. To select the channels you want to use, you must select the lowest-numbered of the desired channels, called the "base channel." To do this, tap the Edit MIDI button—or press it and use the -/No or +/Yes button—until b[hn is displayed. In a moment or so, the number of the currently selected base channel will be displayed. Use the -/No or +/Yes button to select the first of the six MIDI channels you want to use.

Note: If the base channel is Channel12 or higher, there will not be six higher-numbered channels available within MIDI's 16-channel limit.

FIZMO directs each channel's received MIDI data to a pre-determined destination, as shown below.

Note: MIDI data received on the base channel itself will play the current preset or supply notes to the arpeggiator according to the current state of the Arpeggiator Keyboard button (Page 12).
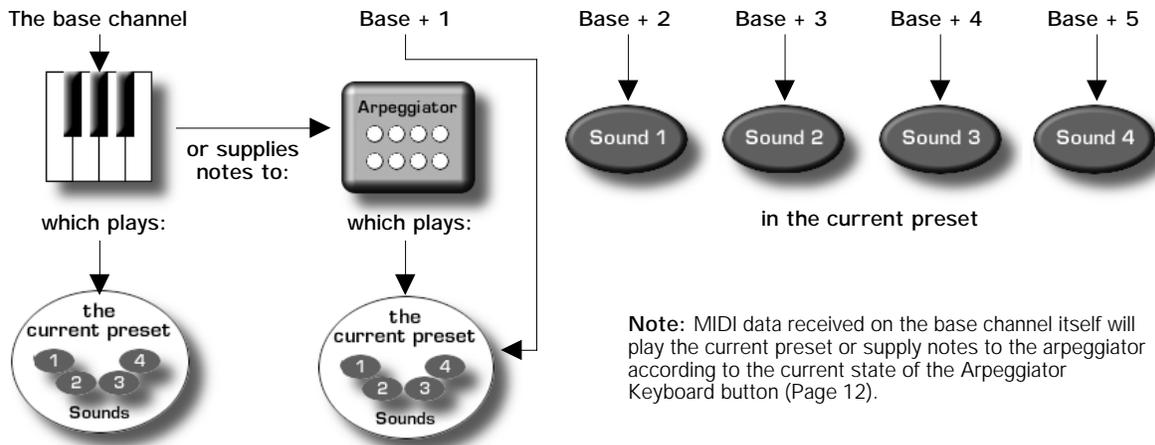
Playing FIZMO and Feeding the Arpeggiator Via MIDI

• To play the currently selected preset via MIDI, or to send FIZMO sounds to be arpeggiated, send data on the base channel, and make sure the Arpeggiator Keyboard button is in the desired position.
• You can also play the currently selected preset using the arpeggiator's MIDI channel.
• To play any of the currently selected preset's individual sounds, send data on the sound's MIDI channel.

FIZMO's sounds can be programmed to respond to any MIDI control message. They're programmed at the factory to respond to standard MIDI controllers such as velocity, pitch bend and modulation wheel messages. The 5Y5 1, 5Y52, 5Y53 and 5Y54 parameters, described on Page 34, allow you to direct non-standard MIDI control messages to any modulatable oscillator parameters (see Page 21).

Note: The arpeggiator automatically synchronizes itself to MIDI clock data received by FIZMO.

Selecting Presets Via MIDI

You can select any of FIZMO's 64 presets via MIDI by sending it the Program Change message corresponding to the preset's number. The presets are mapped to Program Changes 0-63; therefore, to select a preset via MIDI:

- If your external controller sends Program Change values of 0-63, select the desired preset by sending a Program Change value that's one number lower than the number of the desired preset.
- If your external MIDI device transmits Program Change values from 1-64 instead of 0-63, the value you send FIZMO will be the number of the selected preset.

Selecting Preset Sounds Via MIDI

You can change a sound in the currently selected preset by sending the appropriate data on the sound's MIDI channel. To select a sound in the first preset bank, send FIZMO a Bank Select LSB value of 0 followed by the sound's Program Change number—the 128 sounds can be selected with Program Change values of 0-127 or 1-128, depending on the Program Change value range of your external MIDI device. To select a sound in the second preset bank, send a Bank Select LSB value of 1 followed by the sound's Program Change number.

Tip: For a table showing the Program Change value corresponding to each of FIZMO's sounds, see Page 39.

Transmitting MIDI

Notes and Controller Data

The setting of the Keyboard MIDI parameter (*brd*) determines the preset-playing and MIDI-transmission capabilities of the keyboard, pitch bend and modulation wheels. To set the parameter, tap the MIDI Edit button—or press it and use the -/No or +/Yes button—until *brd* is displayed. When the current *brd* value appears, use the -/No or +/Yes button to select the desired value. If *brd* is set to:

MIDI

Edit

- *LOCL*, the keyboard and pitch bend and modulation wheels play onboard sounds and do not transmit MIDI.
- *both*, and the Arpeggiator Keyboard LED is unlit, FIZMO's keyboard and pitch bend and modulation wheels play onboard sounds and transmit MIDI note and controller data on the selected base channel (Page 31).
- *Out*, and the Arpeggiator Keyboard LED is unlit, FIZMO's keyboard and pitch bend and modulation wheels transmit MIDI note and controller data on the currently selected base channel. Onboard sounds do not play.

Note: When *brd* is set to *Out*, FIZMO operates in traditional Local-Off mode, wherein its sounds play only via MIDI and not from its own keyboard.

The setting of the Arpeggiator MIDI Out parameter (*Rout*) determines the preset-playing and MIDI-transmission capabilities of the arpeggiator. To set the *Rout* parameter, tap the MIDI Edit button—or press it and use the -/No or +/Yes button—until *Rout* is displayed. In a moment, the parameter's current value will appear. Use the -/No or +/Yes button to select the desired value. When *Rout* is set to:

- *LOCL*, the arpeggiator plays the currently selected preset. It does not transmit MIDI note or controller data.
- *both*, the arpeggiator plays the currently selected preset and transmits the arpeggiator's notes, as well as controller data contained in the currently selected arpeggiator preset, on the base channel plus one.
- *Out*, FIZMO transmits the arpeggiator's notes, as well as controller data contained in the currently selected arpeggiator preset, on the base channel plus one. It does not play the currently selected preset.

Bank Selects and Program Changes

When you select a new preset, a Program Change message corresponding to the preset's number will be transmitted on the base channel. The 64 presets are assigned to Program Change value 0-63, respectively.

When you select a new sound, FIZMO transmits Bank Select and Program Change values on its MIDI channel:

- Sound button 1 transmits Bank Select and Program Change data on the base channel plus two.
- Sound button 2 transmits Bank Select and Program Change data on the base channel plus three.
- Sound button 3 transmits Bank Select and Program Change data on the base channel plus four.
- Sound button 4 transmits Bank Select and Program Change data on the base channel plus five.

When selecting one of the 127 sounds belonging to presets in Bank 1, a Bank Select LSB value of 0 is transmitted along with a Program Change value corresponding to the selected sound, from 0-127.

When selecting one of the 127 sounds belonging to presets in Bank 2, a Bank Select LSB value of 1 is transmitted along with a Program Change value corresponding to the selected sound, from 0-127.

Dumping Data To and From FIZMO

FIZMO uses MIDI SysEx (for "System Exclusive") data as a means for transmitting presets and sounds via MIDI for storage in an external MIDI device—such as a disk drive or sequencer—and for returning them back to FIZMO. The movement of SysEx data from device to device is called "dumping."

Note: Presets and sounds are not erased from FIZMO's memory when you dump them to an external device.

Setting FIZMO's SysEx ID

SysEx data is designed to be understood only by the device for which it's intended. This allows you to send FIZMO SysEx data without fear that another MIDI instrument will attempt to load it. It also contains an ID number that allows you direct the data to the desired FIZMO in a system containing more than one. To set FIZMO's SysEx ID, tap the MIDI Edit button until *ι d* is displayed; in a moment, FIZMO's current *ι d* number will appear. Use the -/No or +/Yes button to select the desired number.

Warning: When returning SysEx data back to FIZMO, make sure that FIZMO's *ι d* parameter is set to the same value that was in place when you originally dumped the data to your external MIDI device.

Sending SysEx Data

To dump a preset or preset bank to an external MIDI device:

1. Prepare the external device to receive a SysEx dump—consult its documentation to learn how.
2. Press the MIDI Dump button—its LED will begin to flash.
3. Use the -/No or +/Yes button to select the preset you'd like to dump, or select *bᴿn 1* to dump all of the presets in Bank 1, or *bᴿn2* to dump all of the presets in Bank 2.
4. Press the Dump button again to execute the dump.

To dump a preset sound:

1. Select the preset containing the sound you want to dump.
2. Press the Dump button—its LED will begin to flash.
3. Select the sound by pressing its Sound button.
4. Press the Dump button.

Note: If your external device does not successfully receive the SysEx dump, you can slow down the speed at which FIZMO sends the data by resetting the *dLᴿЧ* parameter. See Page 34.

Receiving SysEx Data

To receive a SysEx data dump containing a preset or preset bank, initiate the dump from the external device—consult its documentation to learn how. When the preset is received by FIZMO, it's placed in the Compare buffer from where it can be auditioned. Save the preset to store it in FIZMO's memory (see Page 20).

To receive an individual sound in a SysEx dump:

1. Select the preset in which you want to save the sound (Page 9).
2. Press the Sound button corresponding to the sound slot in which you want to place the sound (Page 15).
3. Initiate the dump from the external device—consult its documentation to learn how. The sound will be dumped into the designated slot in the currently selected preset, and the newly-edited preset will be placed in the Compare buffer (Page 15) so you can hear it.
4. Save the preset (see Page 20).

Assorted MIDI Parameters

MIDI

FIZMO's global parameters let you configure FIZMO for use in your studio. To set these parameters, tap the MIDI Edit button, or press it and use the -/No or +/Yes button, until the desired parameter is displayed—when its current value appears, use the -/No or +/Yes button to select the desired value.

Edit

Parameter:	Displayed as:	What it does:
Base channel	bChn	selects FIZMO's reception/transmission MIDI channels; see Page 31
SysEx ID	id	assigns an ID number to FIZMO for use with SysEx data; see Page 33
Touch	tch	allows you to set the response of FIZMO's keyboard; see Page 10
Foot Switch 1 Foot Switch 2	Ft 1 Ft 2	allows you to designate the function of the left- and right-hand pedal, respectively, in an attached SW-10 foot switch; see Page 6
Pitch Bend	bEnd	sets the maximum amount of upward and downward pitch bend applied by FIZMO's pitch bend wheel; see Page 10
Held Pitch Bend	PhLd	enables or disables held pitch-bend feature; see Page 10
Tune	tunE	raises or lowers FIZMO's tuning by cents; from -50c to (plus) 50c
Keyboard MIDI	brd	sets whether FIZMO's keyboard will play onboard sounds, transmit MIDI or both; see Page 32
System Controller 1 System Controller 2	SYS1 SYS2	designates a MIDI controller for use as SYS1 or SYS2 modulator in FIZMO's sounds; see "The Four System Controllers" below
System Controller 3	SYS3	designates a MIDI controller to be transmitted when the F knob is turned; see "The Four System Controllers" below
System Controller 4	SYS4	designates a MIDI controller to be transmitted when the Z knob is turned; see "The Four System Controllers" below
NRPN	nrPn	enables or disables transmission of NRPN data; see "Recording and Playing Back Edits Using NRPNs" on Page 35
Arpeggiator MIDI Out	Aout	sets whether the arpeggiator will transmit MIDI data; see Page 32
Arpeggiator Bypass	bPAS	sets whether FIZMO's keyboard will be directed to the arpeggiator or bypass it; see Page 12
Arpeggiator Tempo Source	AtPO	sets the behavior of the arpeggiator tempo when a new preset is selected; see Page 12
Dump Delay	dLAY	slows the transmission of SysEx data when transmitting to a slow external MIDI device; 0 is fastest setting, 3 is slowest
Line In	LnIn	determines a connected microphone's audio routing; see Page 5

Saving MIDI Edit Button Parameter Values to FLASH

To make the above settings permanent, they must be burned to FLASH memory. To do this, press the Sound Save button when any of the above parameters are displayed. FIZMO will show brn?, asking you to verify that you want to write your current global settings to FLASH. Press the +/Yes button to execute the procedure, or the -/No button to cancel it. The display will show burn as FIZMO saves the settings.

Compare

Save

Tip: To learn how to reset the global parameters to their factory values, see Page 41.

The Four System Controllers

FIZMO provides four special system controllers that can be used for the modulation of its sounds—as modulators called "SYS1," SYS2," "SYS3" and "SYS4" as described on Page 21—and for the transmission of MIDI controller data. Any of the four can be assigned to any type of MIDI controller data, as listed on Page 35:

• When you designate a MIDI controller as System Controller 1 or System Controller 2, if FIZMO receives data of that type, it's directed to any oscillator setting to which SYS1 or SYS2 is applied as a modulator.

• When you designate a MIDI controller as System Controller 3 or System Controller 4, FIZMO transmits that type of data when either the F or O F-I-Z-M-O knobs are turned, respectively.

Note: You can record F and O knob movements into an external MIDI sequencer set to receive the type of controller data assigned to 5Y53 and 5Y54. When playing back such data, make sure that your SYS3 and SYS4 assignments have not changed, or your movements will not be reproduced.

List of MIDI Controllers

Bank Select #000—Bank Select	Balance #040—Balance LSB	GenPurpse5#080—General Purpose 5
Mod Wheel #001— Mod Wheel or Lever	MIDIContrl#041—UNDEFINED	GenPurpse6#081—General Purpose 6
Breath #002—Breath Controller	Pan #042—Pan LSB	GenPurpse7#082—General Purpose 7
MIDIContrl#003—UNDEFINED	Expression#043 —Expression LSB	GenPurpse8#083—General Purpose 8
FootContrl#00—Foot Controller	FXControl1#044—Effect Control 1 LSB	Portamento#084—Portamento Control
Glide Time#00—Portamento Time	FXControl2#045—Effect Control 2 LSB	MIDIContrl#085—UNDEFINED
Data Entry#00—Data Entry MSB	MIDIContrl#046—UNDEFINED	MIDIContrl#086—UNDEFINED
Volume #007—Volume	MIDIContrl#047—UNDEFINED	MIDIContrl#087—UNDEFINED
Balance #008—Balance	GenPurpse1#048—UNDEFINED	MIDIContrl#088—UNDEFINED
MIDIContrl#009—UNDEFINED	GenPurpse2#049—General Purpose 1 LSB	MIDIContrl#089—UNDEFINED
Pan #010—Pan	GenPurpse3#050—General Purpose 2 LSB	MIDIContrl#090—UNDEFINED
Expression#011—Expression	GenPurpse4#051—General Purpose 3 LSB	FX Depth 1#091—Effects Depth 1
FX Control1#012—Effect Control 1	MIDIContrl#052—General Purpose 4 LSB	FX Depth 2#092—Effects Depth 2
FX Control2#013—Effect Control 2	MIDIContrl#053—UNDEFINED	FX Depth 3#093—Effects Depth 3
MIDIContrl#014—UNDEFINED	MIDIContrl#054—UNDEFINED	FX Depth 4#094—Effects Depth 4
MIDIContrl#015—UNDEFINED	MIDIContrl#055—UNDEFINED	FX Depth 5#095—Effects Depth 5
GenPurpse1#016—General Purpose 1	MIDIContrl#056—UNDEFINED	Data Inc #096—Data Inc
GenPurpse2#017—General Purpose 2	MIDIContrl#057—UNDEFINED	Data Dec #097—Data Dec
GenPurpse3#018—General Purpose 3	MIDIContrl#058—UNDEFINED	NonRgPmLSB#098—Non Reg param Num LSB
GenPurpse4#019—General Purpose 4	MIDIContrl#059—UNDEFINED	NonRgPmMSB#099—Non Reg param Num MSB
MIDIContrl#020—UNDEFINED	MIDIContrl#060—UNDEFINED	RgParamLSB#100—Reg param Num LSB
MIDIContrl#021—UNDEFINED	MIDIContrl#061—UNDEFINED	RgParamMSB#101—Reg param Num MSB
MIDIContrl#022—UNDEFINED	MIDIContrl#062—UNDEFINED	MIDIContrl#102—UNDEFINED
MIDIContrl#023—UNDEFINED	MIDIContrl#063—UNDEFINED	MIDIContrl#103—UNDEFINED
MIDIContrl#024—UNDEFINED	Sustain #064—Sustain	MIDIContrl#104—UNDEFINED
MIDIContrl#025—UNDEFINED	PortOn/Off#065—Portamento On/Off	MIDIContrl#105—UNDEFINED
MIDIContrl#026—UNDEFINED	Sostenuto #066—Sostenuto	MIDIContrl#106—UNDEFINED
MIDIContrl#027—UNDEFINED	Soft Pedal#067—Soft Pedal	MIDIContrl#107—UNDEFINED
MIDIContrl#028—UNDEFINED	LegatoFtsw#068—Legato Ftsw	MIDIContrl#108—UNDEFINED
MIDIContrl#029—UNDEFINED	Hold 2 #069—Hold 2	MIDIContrl#109—UNDEFINED
MIDIContrl#030—UNDEFINED	PatchSelct#070—Snd Variation (Patch Select)	MIDIContrl#110—UNDEFINED
MIDIContrl#031—UNDEFINED	Timbre #071—Harmonic Content (Timbre)	MIDIContrl#111—UNDEFINED
BankSelect#032—Bank Select LSB	Release #072—Release	MIDIContrl#112—UNDEFINED
Mod Wheel #033—Mod Wheel LSB	Attack #073—Attack	MIDIContrl#113—UNDEFINED
Breath #034—Breath Controller LSB	Brightness#074—Brightness	MIDIContrl#114—UNDEFINED
MIDIContrl#035—UNDEFINED	SoundCntl6#075—Sound Controller 6	MIDIContrl#115—UNDEFINED
FootContrl#036—Foot Controller LSB	SoundCntl7#076—Sound Controller 7	MIDIContrl#116—UNDEFINED
Glide Time#037—Portamento Time LSB	SoundCntl8#077—Sound Controller 8	MIDIContrl#117—UNDEFINED
Data Entry#038—Data Entry LSB	SoundCntl9#078—Sound Controller 9	MIDIContrl#118—UNDEFINED
Volume #039—Volume LSB	SoundCtl10#079—Sound Controller 10	MIDIContrl#119—UNDEFINED

Recording and Playing Back Edits Using NRPNs

When FIZMO's NRPN (for "Non-Registered Parameter") transmission is enabled, NRPN data is sent from FIZMO's MIDI Out jack when you edit its oscillators. This allows you to record your edits into an external sequencer. You can re-transmit this data back to FIZMO—along with the Bank Select and Program Changes required to select the desired preset—to play back your edits. NRPN reception is always enabled in FIZMO.

To enable NRPN transmission, tap the MIDI Edit button—or press it and use the -/No or +/Yes button—until *nrPn* is displayed. In a moment, the current *nrPn* value will be shown. Use the -/No or +/Yes button to set it to *On* to enable NRPN transmission, or *OFF* to disable it.

FIZMO MIDI Implementation Chart

FIZMO		MIDI Implementation Chart		Version 1.O
Function...		**Transmitted**	**Recognized**	**Remarks**
Basic	Default	1	1-16	FIZMO's presets receive data on base channel; arpeggiator on base+1; Sound 1 on base+2; Sound 2 on base+3; Sound 3on base+4; Sound 4 on base+5
Channel	Changed	1-16	1-16	
Mode	Default	POLY	POLY/MULTI	Reception on base channel and base+1 is POLY; base+2-5 is MULTI
	Messages	X	X	
	Altered	X	X	
Note	True Voice	21-108	21-108	arpeggiator note reception is filtered by *Lo!n* and *Hi!n* parameters
Number				
Velocity	Note On	O	O	
	Note Off	O	O	
After	Key	X	O	Keyboard produces channel pressure only
Touch	Channel	O	O	
Pitch Bend		O	O	
Control		0-119	0-119	Bank Select MSB is always 0
Change				
Program	True #	0-127	0-127	Program Changes 0-63 received on base channel select presets; Bank Select LSB0 + Program Change on Sound MIDI channel selects sounds from preset bank 1, Bank Select LSB1 + Program Change on Sound MIDI channel selects sounds from preset bank 2
Change		0-127	0-127	
System Exclusive		O	O	
System	Song Position	X	X	
Common	Song Select	X	X	
	Tune Request	X	X	
System	Clock	O	O	
Real Time	Commands	X	X	
Aux	Local On/Off	X	X	
Messages	All Notes Off	O	O	
	Active Sensing	X	X	
	System Reset	X	X	
Notes				

Mode 1: Omni On, Poly	Mode 2: Omni On, Mono	O: Yes
Mode 3: Omni Off, Poly	Mode 4: Omni Off, Mono	X: No

8—Supplemental Info

FIZMO's Factory Presets

Preset Bank 1

01	MovieLife Pad	Rich, complex evolving pad. Play one note and tweak the "O" knob for an interesting organic effect.
02	DelArpLayers	A variety of delicate arpeggiator sounds. Try different combinations of the four sounds and arpeggiator patterns for an endless variety of moving textures.
03	Bass&Lead	A bass/lead split with 16th note arpeggiation on the Bass
04	DK Pad	A mellow analog-style pad with vocal, string, and bell components. Sounds great with the arpeggiator.
05	Phasestep VelSwt	A unique lead with a pitched, percussive attack and a rhythmic layer produced with harder velocities. Arpeggiator affects only the lower two octaves.
06	AnaStrng Pad	Lush analog string pad perfect for that big orchestral wash. "O" knob raises one layer by an octave, another by a fifth. Try selecting the individual sounds or layer combinations for different string pads.
07	Eden Pad	Huge evolving pad with lots going on at the touch of a single key. "O" knob raises the pitch of some components. Arpeggiator uses a special preset that sweeps the filter while letting you play keys.
08	Gargantuan	Big noisy rhythmic sound that works as a bass or lead sound.
09	Percolator Splt	Synth bass on the left hand, bright comp sound with synched delays on the right hand. Arpeggiator only affects upper split.
10	ChimeHorn+	Nice analog horn sound with soft chime component. "O" knob turns chime down. Try Sounds 3 and 4 for alternate horn sounds.
11	Trigger Split	A bubbly rhythmic sound that follows system tempo. Left hand split is mono, right hand is polyphonic.
12	Belly Bass	Bass sound with rhythmic chimes riding on top. "O" knob turns off chimes, leaving only the bass. Sounds 3 and 4 can be selected or layered for alternate bass sounds.
13	MultiBass 1	Phat chorused bass sound. "0" knob changes the octave range of some oscillators. The arpeggiator affects only the upper three octaves. Try different sounds layered with Sound 4 for different effects.
14	Chainsaw Lead	The name says it. A bright, cutting lead sound that will cut through anything. "O" knob adds a rhythmic "drumming" sound to the mix.
15	Phiz Zplit	Split with an arpeggiated bass and retro lead. The "O" knob crossfades between lead sounds.
16	Sand Storm	Huge pad with lots going on. "O" knob accentuates the rhythmic component
17	RhythmPad Split	Warm bass/pad split. The rhythmic component of the pad is synched to clock.
18	Sharp Pad	Bright velocity-sensitive pad with many uses. Try tweaking the "O" knob for a resonant low-end effect. Also arpeggiates well.
19	Arp Percs	Four quick percussive synth sounds perfect for arpeggiating. Try different combinations split and/or layered. "O" knob plays with pitch and panning.
20	Twinkle Arp	Great 3-way split, with arpeggiated bass on the bottom, an arpeggiated chime pad in the middle, and lead on top. The "O" knob mainly affects the chime pad. Try this with and without the arpeggiator.
21	EP Pad	Warm electric piano with an analog-type pad that follows. "O" knob turns the pad component down. Try layering Sounds 3 and 4 with Sound 1 for alternate pads.
22	RandomArps	A collection of arpeggiator sounds. Try different combinations for various effects. The "O" knob performs transpositions on each sound.
23	4 Leads	A collection of patches suitable for leads or basses. Try various combinations.
24	CC Rhythm Lead	A searing lead sound with a rhythmic "chaser" component. "O" knob fades out the "chaser."
25	SH's	A collection of sample -and-hold sounds, ranging from pitched to way out there.
26	PhizClavZplit	Wacky bass/key split. Try tweaking the "O" knob while the bass arpeggiates!
27	Saturn Dance	Bass and pad split. Arpeggiator only affects lower split. "O" knob lowers the level of rhythmic components, making the sound more "normal"
28	HornFrogg Stab	Huge layer with velocity-triggered bass patch.
29	String Bass Splt	Analog-style bass/string split. The "O" knob crossfades between string textures.
30	Bell Bass Splt	Tight synth bass on the left hand, a bell pad on the right hand. Arpeggiator only affects lower split
31	Dance Selects	Noisy rhythmic groove that just keeps going. "O" knob completely changes the sound's character.
32	Glappin VelSwtch	Kind of metallic, kind of analog comp sound with a resonant blip sweeping in the background. "O" knob reduces the level of the blips.

Preset Bank 2

33	Ray's Interupt	Rich, evolving data pad. The "O" knob will fade in other components when turned counter-clockwise.
34	AtomicSplashDown	The name says it all!
35	Big Pad	A big pad with a resonant attack. Try substituting Sounds 2 and 3.
36	Bellzigger	A nice mellow bell preset if played with staccato notes. Holding the keys will produce an evolving bell pad. Try tweaking both the Mod Wheel and "O" knob with keys depressed.
37	4 Pads 3	Rich pad with sharp attack. Tweak the "O" knob for an interesting harmony.
38	Motion Pad	A bright analog-sounding pad with nice movement and character. "O" knob changes the octave of some layers. Try playing with different combinations of Sounds 1 through 4.
39	Rez O'Pad	A vintage resonant brass pad. Try the other sounds in this preset for more analog variations.
40	AnaArpSelects	A collection of analog-style arpeggiators. Tweak the "O" knob to add harmony, tweak the "F" knob to add sync-able rhythmic delays.
41	Arp Layer	A basic set of arpeggiator sounds. The "O" knob will crossfade between sounds and add harmony.
42	ArpSplit	Analog-style bass/string split. Try different arpeggiator patterns on the bass for different effects. Tweaking the "O" knob adds a 5th above the string pad, giving the preset an almost Asian flavor.
43	HiPass Arps	Arpeggiator preset with sweeping resonant filter. Tweak the "O" knob to add harmonies.
44	Arp Pad 1	Bright evolving pad with a quick release that works great with the arpeggiator. "O" knob turns down the wacky gliding component.
45	OutThereSplit	It's out there. A wild evolving patch that's perfect for that next horror film score.
46	NorthHunting Pad	Big evolving pad with complex, rich textures. The "O" knob fades out certain components.
47	HornPulsa Pad	"Analog" horn sound with a subtle bell-like component.
48	Lead Me To It	Vintage lead with synched delays. "F" knob controls the feedback of the delay, the "O" knob adds that perfect fifth harmony you've been looking for.
49	I.O.U. etc.	This preset talks to you. Sound 1 says, "I owe you." Sounds 2-4 provide an alternate selection of sounds with a somewhat "vocal" quality.
50	Trance/BellSplit	Left hand plays a trance chord. Chord consists of the note played, a 4th below the note, a major 2nd above the note, and a 5th above the note. Right hand plays an analog bell lead. The "O" knob changes inversion of the chord.
51	YesZap Stab	Bright analog pad with a resonant blip at the beginning. "O" knob lowers the volume of the blip.
52	Rich Vel Splt	Rich and unique sound suitable for pads, leads, or comp. This preset has several split and velocity-triggered components.
53	Sand Soft Pad	A nice, mellow, evolving EP pad. This preset has a sweeping resonant pattern.
54	Crystal Split	Very glassy and sustained pad in the lower three octaves, an arpeggiated bell pattern in the upper two octaves. The "O" knob tweaks harmonies.
55	QMe noise	A bright percussive lead harp sound with a wild filter sweep behind it. "O" knob increases the volume of the "noisy" part.
56	Jim's Interupt	Warm, evolving lead. This preset is saved with the "O" knob fully tweaked to add harmonies. Turn the "O" knob counter-clockwise to remove harmonies.
57	Organs	Leslie organ sound. "F" knob changes rotary speaker speed. "O" knob reduces "percussion component
58	4 Analogs	Four basic analog-style patches. Arpeggiator adds sweeping resonance.
59	Trans Puls Splt	Split with bass in the left hand, a rhythmic speaking pad in the right hand. The "O" knob changes the character of the pad, the arpeggiator will play notes and modulate the filter of the rhythmic pad. Try adding Sound 2 to the upper split as well.
60	CozmicPad	Feel the cosmos. The "O" knob will transport you to another level of existence.
61	Warp Bass	A nasty, warped techno-bass. The "O" knob will fade in the resonant, rhythmic noise. Sounds 3 and 4 are variants of an electronic groove, with different components controlled by the "O" knob, pressure, and the mod wheel.
62	Vocoder Gruv	Sounds 2, 3 and 4 are routed to the vocoder effect. Mic input is required to hear these voices. Sound 1 plays a groove—"O" knob turns groove off. Turn "O" knob all the way up to hear only vocoder.
63	Drum Fun	A synth drum map prefect for those dance grooves. Sounds 1-4 route the kit to different effects busses. "O" knob turns the drum sounds backwards. Try turning on the arpeggiator and see what kind of random madness you can generate.
64	Template Preset	A handy starting point for programming your own sounds from scratch.

Sound Location-to-MIDI Program Change Translator

FIZMO Preset Bank 1—Bank Select LSB 0

FIZMO Preset	FIZMO Sound	Program Change	FIZMO Preset	FIZMO Sound	Program Change
1	1	0	17	1	64
	2	1		2	65
	3	2		3	66
	4	3		4	67
2	1	4	18	1	68
	2	5		2	69
	3	6		3	70
	4	7		4	71
3	1	8	19	1	72
	2	9		2	73
	3	10		3	74
	4	11		4	75
4	1	12	20	1	76
	2	13		2	77
	3	14		3	78
	4	15		4	79
5	1	16	21	1	80
	2	17		2	81
	3	18		3	82
	4	19		4	83
6	1	20	22	1	84
	2	21		2	85
	3	22		3	86
	4	23		4	87
7	1	24	23	1	88
	2	25		2	89
	3	26		3	90
	4	27		4	91
8	1	28	24	1	92
	2	29		2	93
	3	30		3	94
	4	31		4	95
9	1	32	25	1	96
	2	33		2	97
	3	34		3	98
	4	35		4	99
10	1	36	26	1	100
	2	37		2	101
	3	38		3	102
	4	39		4	103
11	1	40	27	1	104
	2	41		2	105
	3	42		3	106
	4	43		4	107
12	1	44	28	1	108
	2	45		2	109
	3	46		3	110
	4	47		4	111
13	1	48	29	1	112
	2	49		2	113
	3	50		3	114
	4	51		4	115
14	1	52	30	1	116
	2	53		2	117
	3	54		3	118
	4	55		4	119
15	1	56	31	1	120
	2	57		2	121
	3	58		3	122
	4	59		4	123
16	1	60	32	1	124
	2	61		2	125
	3	62		3	126
	4	63		4	127

FIZMO Preset Bank 2—Bank Select LSB 1

FIZMO Preset	FIZMO Sound	Program Change	FIZMO Preset	FIZMO Sound	Program Change
33	1	0	49	1	64
	2	1		2	65
	3	2		3	66
	4	3		4	67
34	1	4	50	1	68
	2	5		2	69
	3	6		3	70
	4	7		4	71
35	1	8	51	1	72
	2	9		2	73
	3	10		3	74
	4	11		4	75
36	1	12	52	1	76
	2	13		2	77
	3	14		3	78
	4	15		4	79
37	1	16	53	1	80
	2	17		2	81
	3	18		3	82
	4	19		4	83
38	1	20	54	1	84
	2	21		2	85
	3	22		3	86
	4	23		4	87
39	1	24	55	1	88
	2	25		2	89
	3	26		3	90
	4	27		4	91
40	1	28	56	1	92
	2	29		2	93
	3	30		3	94
	4	31		4	95
41	1	32	57	1	96
	2	33		2	97
	3	34		3	98
	4	35		4	99
42	1	36	58	1	100
	2	37		2	101
	3	38		3	102
	4	39		4	103
43	1	40	59	1	104
	2	41		2	105
	3	42		3	106
	4	43		4	107
44	1	44	60	1	108
	2	45		2	109
	3	46		3	110
	4	47		4	111
45	1	48	61	1	112
	2	49		2	113
	3	50		3	114
	4	51		4	115
46	1	52	62	1	116
	2	53		2	117
	3	54		3	118
	4	55		4	119
47	1	56	63	1	120
	2	57		2	121
	3	58		3	122
	4	59		4	123
48	1	60	64	1	124
	2	61		2	125
	3	62		3	126
	4	63		4	127

FIZMO's Arpeggiator Presets

Preset:	Name:
000:	default
001:	Up/down 1
002:	Random 1
003:	Up 2
004:	Down 1
005:	Up/down vintage 1
006:	Up/down choppy 1
007:	Double up/down 1
008:	Down vintage 1
009:	Picked
010:	Picked 2
011:	Random 2
012:	Random 3
013:	16 notes 1
014:	8 notes choppy 1
015:	1 multi
016:	Up 1
017:	Up 4x 1
018:	Octave jump 1
019:	8 octaves up/down 1
020:	8 octaves up/down 2
021:	Octave jump 2
022:	Interleaved 1
023:	Interleaved 2
024:	Sustained pluck 1
025:	Dance around 1
026:	Wild Thing 1
027:	Wild Thing 2
028:	Down 2
029:	Cycle 1
030:	Cycle 2
031:	Sweeper 1
032:	Sweeper 2
033:	Sweeper 3
034:	Sweeper 4
035:	Sweeper 5
036:	Sweeper 6
037:	Sweeper 7
038:	4ths up 1
039:	4ths down 1
040:	4ths up/down 1
041:	4ths up/down 2
042:	4th up sweep
043:	5ths up 1
044:	5ths down 1
045:	5ths up/down 1
046:	5th up sweep
047:	Double-stops up
048:	Up Down 2
049:	Up/up/down/down
050:	Up/up/down/down 2
051:	Double-stops 2

Preset:	Name:
052:	Transwave mod 1
053:	Double down
054:	Pad 1
055:	Random 8 octaves
056:	Skippy 1
057:	Skippy 2
058:	Spread octave 1
059:	Spread octave 2
060:	Doubled up
061:	Doubled up2
062:	Up/down velocity 1
063:	Doubled down 2
064:	Bass Line 1
065:	Bass Line 2
066:	Bass Line 3
067:	Octave up
068:	Octave down
069:	Octave Up
070:	Riff
071:	Riff
072:	Octave down
073:	Riff
074:	Riff
075:	Riff 11
076:	Riff 12
077:	Riff 13
078:	Riff 14
079:	Riff 15
080:	Riff 16
081:	Riff 17
082:	Riff 18
083:	Riff 19
084:	Riff 20
085:	Riff 21
086:	Riff 22
087:	Riff 23
088:	Riff 24
089:	Riff 25
090:	Riff 26
091:	Riff 27
092:	Riff 28
093:	Riff 29
094:	Riff 30
095:	Riff 31
096:	Riff 32
097:	Riff 33
098:	Riff 34
099:	Riff 35
100:	Riff 40
101:	Riff 41
102:	Mod wheel, 2 bars
103:	Mod wheel, 4 bars

| Preset:	Name:
104:	Mod whl up/dwn, 8 bars
105:	Md whl up/dwn, 16 bars
106:	Pan 2 bars
107:	Pan Random
108:	Pan Random 2
109:	Pan out/in
110:	Filter mod, 4 bar
111:	Filter mod, 8 bar
112:	Filter mod, 16 bar
113:	Transwave mod, 2 bars
114:	Transwave mod, 4 bars
115:	Detune mod, 2 bars
116:	Detune mod, 4 bars
117:	Sustain on

Updating FIZMO's Operating System

The software that makes FIZMO run is called its "operating system" or "OS." FIZMO's OS is stored in its FLASH memory (see Page 3). From time to time, ENSONIQ may release a new FIZMO OS—a new OS typically contains feature enhancements to make you FIZMO even more powerful, and may also includes changes to FIZMO's software that will make it operate more smoothly. To keep up with the latest FIZMO development, and obtain OS updates as they're published, visit the ENSONIQ World Wide Web site at *http://www.ensoniq.com*.

Note: If you can't access ENSONIQ Web site, or don't own a computer, see your authorized ENSONIQ dealer for assistance in updating your FIZMO.

To Find Out Which Version of the FIZMO OS is Currently Installed

MIDI

To learn which version of the FIZMO OS you're currently using, hold down the MIDI Edit button and, while continuing to hold it, press the Dump button—the current OS version's number will be displayed.

Edit

Dump

To Update FIZMO's OS

FIZMO operating system updates are Standard MIDI File sequences that deliver the OS to FIZMO as packets of SysEx data on one of the sequence's tracks. You can "play" the new OS right into FIZMO from any sequencer program that can play a Standard MIDI File containing SysEx data.

1. Download the OS update file appropriate to your Mac OS or Windows computer from ENSONIQ's Web site.
2. Double-click the file to decompress it, saving it to a convenient location on your computer' hard drive.
3. Load the OS sequence file into your sequencing program.
4. Direct Track 1 of the OS sequence to FIZMO.
5. Start playback of the sequence—you can follow FIZMO's progress by watching its display:
   - FIZMO will begin the process by clearing memory for the OS; you'll see *ErAS* ("erase") on its display, followed by *rdY* ("ready") to show that FIZMO's waiting for the first packet of SysEx data.
   - As data is being received by FIZMO, its display will show *Ld* ("load") and a small animation.
   - When FIZMO finishes receiving a packet, it will burn its data to FLASH memory, showing *burn* on its display. When each packet has been burned, the display will return to *rdY* to show that FIZMO's awaiting the next chunk of data.
6. Let the sequence play to its end. When the new OS is in place, FIZMO will restart itself.

Troubleshooting the OS Updating Procedure

The speed at which the OS SysEx data is transmitted to FIZMO is dependent on your MIDI setup. If the sequence plays too quickly, FIZMO will not have time to burn one packet of data before the next arrives—*E OS* ("error OS") will appear in its display to show that the updating process has failed. If this occurs, set the playback speed of the sequence to a slower tempo and try again. A tempo of 100 bpm will usually suffice, but you can set it as low as you need to. If you continue to have problems, call ENSONIQ Customer Service at 610-647-3930.

Restoring FIZMO's Factory Presets and Sounds

If you wish to restore FIZMO's factory presets and sounds, hold down the Save button and, while still holding it, press the Compare button. FIZMO's display will show *rStP* ("reset?"). Press the +/Yes button to restore the presets and sounds. The display will show *burn* as the factory presets and sounds are burned into FLASH.

Compare

Save

Note: This procedure also restores all system-wide parameters to their factory default values.

Warning: When you restore FIZMO's factory presets and sounds, all presets and sounds currently in memory are erased. Make sure you're not erasing anything you want to keep. (You can dump any presets or sounds to an external MIDI storage device; see Page 33.)

What is MIDI?

Musical instrument and computer manufacturers have agreed upon a set of standards that allows their products to communicate with each other. It's called "MIDI," an acronym for "Musical Instrument Digital Interface." There are two basic aspects to the MIDI standards: the kind of wiring to be used for connecting MIDI devices, and the nature of messages that will be sent through those wires.

Life In The MIDI World

MIDI has opened up incredible possibilities for musicians and music lovers alike. Here are some of the things MIDI has made possible:

- Musicians can record their performances into MIDI recorders—called sequencers—which are found in keyboard workstations, in stand-alone boxes, and in computers. Once recorded, MIDI-recorded performances can be tweaked and nudged to perfection. Musical arrangements can be re-orchestrated after they've been recorded. Full-blown multi-instrument recordings can be easily created.
- Keyboardists can connect their instruments to a myriad of sound-producing MIDI boxes. MIDI allows a conventional-looking keyboard to control a number of such devices at the same time, providing for the creation of new, complex timbres. These same capabilities are available to computer users. Actually, pretty much any musical instrument can be outfitted to control MIDI devices.
- Musicians can benefit from the communication possible between MIDI instruments and computers to program sounds for their instruments on their computers, taking advantage of the computers' large graphic displays.
- Internal data from one MIDI device can be transmitted to another for storage.
- Recording engineers can control mixing consoles and effects devices with MIDI.

Understanding MIDI

MIDI Hardware

The architects of MIDI had to settle, first of all, on the MIDI hardware: the wires. All MIDI cables have the same kind of plug on either end. There are three MIDI sockets, or jacks, on the back of most MIDI instruments. The MIDI Thru jack is for MIDI data that passes through the instrument unchanged on its way to some other MIDI device. The instrument sends out its own MIDI information through the MIDI Out jack. The MIDI In jack is for MIDI
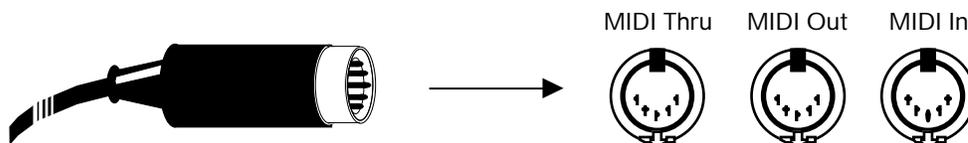
information coming into the instrument.

The MIDI cable itself can carry 16 independent channels of MIDI information that travel together through the wire. This means that you can have 16 separate MIDI conversations going on at once among instruments and/or computers connected together with MIDI cables.

How MIDI Channels Work

MIDI instruments can be set up to listen to specific channels and ignore everything else that's going on. This allows a central device such as a keyboard or your personal computer to control each instrument individually. Some instruments are capable of responding to as many as 16 channels at once. Such instruments are referred to as being multi-timbral—it's as if there are up to 16 musical instruments in one box, and MIDI allows you to control each sound separately, as shown in the illustration on the following page.

sound 1
sound 2
sound 3
sound 4
sound 5
sound 6
sound 7
sound 8
sound 9
sound 10
sound 11
sound 12
sound 13
sound 14
sound 15
sound 16
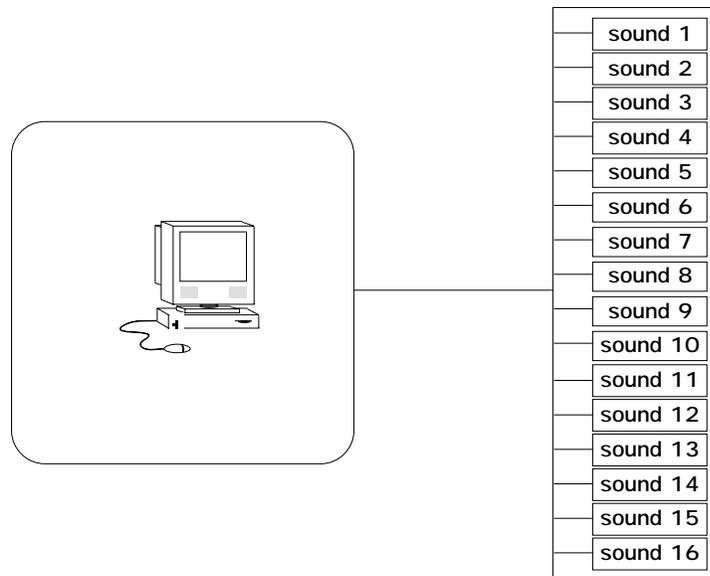
MIDI rigs can also combine both possibilities, with some instruments programmed to respond to one MIDI channel or another, and multi-timbral devices set up to receive up to 16 channels at once.

This MIDI device responds to MIDI channel 1

This MIDI device responds to MIDI channel 2

or

This device responds to MIDI channel 16

This device responds to MIDI channels 3-15
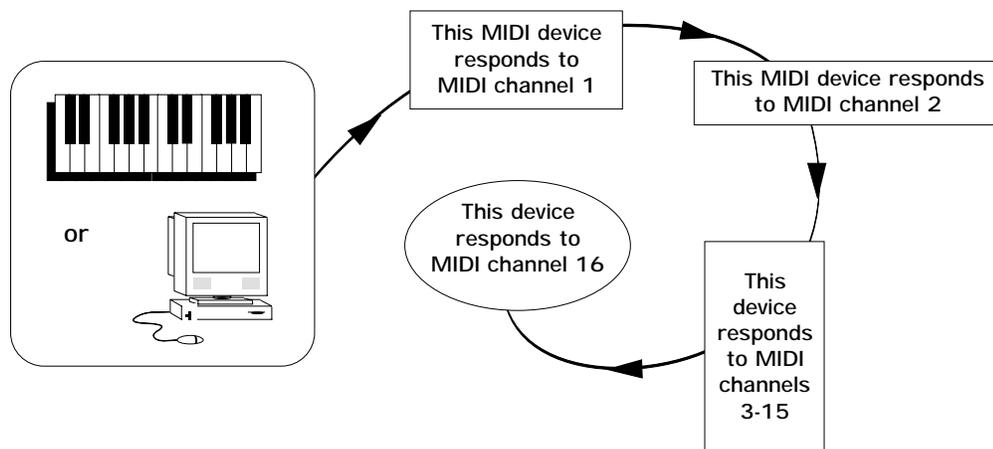
MIDI messages travel up and down all these channels, and these constitute the second major component of the MIDI Spec.

How MIDI Messages Work

MIDI works in a manner reminiscent of the old player pianos, whose sheets of hole-punched paper told the keyboard mechanism which keys to press down and when. It's not sound that's sent through MIDI cables; it's instructions from one MIDI device—called the "controller"—to another. Of course, MIDI generally doesn't cause any keys to physically move.

Suppose a keyboardist presses a note on a keyboard which is controlling some sound-producing MIDI box. The controller would send out a Key Down (or "note-on") message for that note. The MIDI box receiving such a message would play the note. When the keyboardist lets go, the controller would send out a Key Up message, and the receiving device would stop sounding the note. It's as simple at that.

MIDI captures the expressive nuances in a performance by sending out other kinds of messages. Controllers can sense how hard a musician plays—referred to in the MIDI world as "velocity"—and can instruct other devices to respond accordingly. Sustain and sostenuto foot pedals also send out MIDI messages. There are many tools for expression that can be transmitted and responded to via MIDI.

To tell a MIDI instrument which sound program you want to hear, you would send a MIDI Program Change.

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MIDI can also send messages that have the same effect as pushing buttons and twirling knobs on a receiving device. To make sure that only the intended instrument listens to such instructions, MIDI sends it a special greeting in a language only it can understand. Every MIDI device has such a language, and these "hey there" messages are referred to as "System Exclusive headers." System Exclusive data is often referred to as SysEx data.

In MIDI recording, all of the messages that a controller produces are sent to a sequencer. Most sequencers have Record, Stop and Play buttons, since they're usually designed to resemble tape recorders. When the Record button is pressed, the sequencer captures incoming MIDI information. Pressing Stop tells the sequencer to store that information in its memory. When Play is pressed, it sends it back out.

The Art of MIDI

The fact that MIDI is so simple to use is a testament to the cleverness of its designers. Its true magic, however, lies in MIDI's power as a tool in the creative process, and in the imaginations of those artists who wield it.

Proper Care of FIZMO

Temperature Guidelines

FIZMO contains a substantial amount of computerized and electronic circuitry that can be susceptible to damage when exposed to extreme temperature changes. When FIZMO is brought inside after sitting in a cold climate (i.e., the back seat of your car), condensation builds up on the internal circuitry in much the same way a pair of glasses fogs up when you come inside on a cold day. If the unit is powered up as this condensation occurs, components can short out or be damaged. Excessively high temperatures also pose a threat to the unit, stressing both the internal circuits as well as the case. With this in mind, it is highly advisable to follow these precautions when storing and setting up your FIZMO:

- Avoid leaving FIZMO in temperatures of less than 50 degrees Fahrenheit or more than 100 degrees Fahrenheit.
- When bringing FIZMO indoors after travel, allow the unit at least 20 minutes to reach room temperature before powering up. In the case of excessive outdoor temperatures (below 50 degrees Fahrenheit or above 100 degrees Fahrenheit), allow an hour or more before power up.
- Avoid leaving FIZMO inside a vehicle exposed to direct sunlight.

Clean Up and Maintenance

Clean the exterior of your FIZMO with a soft, lint-free, dry (or slightly damp) cloth. You can use a slightly dampened cloth (with a mild neutral detergent) to remove stubborn dirt, but make sure that FIZMO is thoroughly dry before turning on the power. Never use alcohol, benzene, volatile cleaners, solvents, abrasives, polish or rubbing compounds.

Polarization and Grounding

Since FIZMO has an external power adapter, there are no dangerous voltages inside its case. Some other products with two-prong power cords have polarized plugs which can only be inserted into an outlet the proper way.
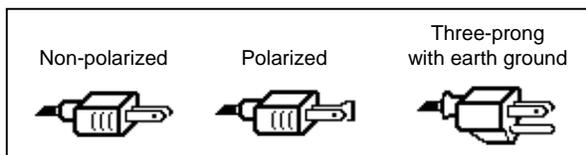
Other products, such as older guitar amplifiers, do not have polarized plugs and can be connected to an outlet incorrectly. This may result in dangerous high voltages on the audio connections, which could cause you physical harm or damage any properly grounded equipment to which they are connected, such as your ENSONIQ product.

To avoid shock hazards or equipment damage, we recommend the following precautions:

- If you own equipment with two-pronged power cords, check to see if they are polarized or non-polarized. You might consider having an authorized repair station change any non-polarized plugs on older equipment to polarized plugs to avoid future problems.
- Exercise caution when using extension cords or plug adapters. Proper polarization should always be maintained from the outlet to the plug. The use of polarized extension cords and adapters is the easiest way to maintain proper polarity.
- Whenever possible, connect all products with grounded power cords to the same outlet ground. This will ensure a common ground level to prevent equipment damage and minimize hum in the audio output.

AC outlet testers are available from many electronic supply and hardware stores. These can be used to check for proper polarity of outlets and cords.

AC Line Conditioning

As with any computer device, FIZMO is sensitive to sharp peaks and drops in the AC line voltage. Lightning strikes, power drops, or sudden and erratic surges in the AC line voltage can scramble the internal memory, and in some cases, damage the unit's hardware. Here are a few suggestions to help guard against such occurrences:

- A surge/spike suppressor. A surge/spike suppresser absorbs surges and protects your gear from all but the most severe over-voltage conditions. You can get multi-outlet power strips with built-in surge/spike suppressers for little more than the cost of unprotected power strips, so using one is a good investment for all your electronic equipment.
- A line conditioner. This is the best, but by far the more expensive way to protect your gear. In addition to protecting against surges and spikes, a line conditioner guards the equipment against excessively high or low line voltages. If you use FIZMO in lots of different locations with varying or unknown AC line conditions, you might consider investing in a line conditioner.

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"INSTRUCTIONS PERTAINING TO A RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS"

IMPORTANT SAFETY INSTRUCTIONS

WARNING—When using electric products, basic precautions should always be followed, including the following:

1. Read all the instructions before using the product.

2. Do not use this product near water - for example, near a bathtub, washbowl, kitchen sink, in a wet basement, or near a swimming pool, or the like.

3. This product should be used only with a cart or stand that is recommended by the manufacturer.

4. This product, either alone or in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in the ears, you should consult an audiologist.

5. The product should be located so that its location or position does not interfere with its proper ventilation.

6. The product should be located away from heat sources such as radiators, heat registers, or other products that produce heat.

7. The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.

8. This product may be equipped with a polarized line plug (one blade wider than the other). This is a safety feature. If you are unable to insert the plug into the outlet, contact an electrician to replace your obsolete outlet. Do not defeat the safety purpose of the plug.

9. The power supply cord of the product should be unplugged from the outlet when left unused for a long period of time.

10. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

11. The product should be serviced by qualified service personnel when:

    a. The power supply cord or the plug has been damaged; or
    b. Objects have fallen, or liquid has been spilled into the product; or
    c. The product has been exposed to rain; or
    d. The product does not appear to operate normally or exhibits a marked change in performance; or
    e. The product has been dropped, or the enclosure damaged.

12. Do not attempt to service the product beyond that described in the user-maintenance instructions. All other servicing should be referred to qualified service personnel.

SAVE THESE INSTRUCTIONS