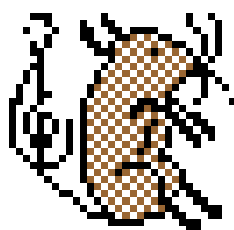
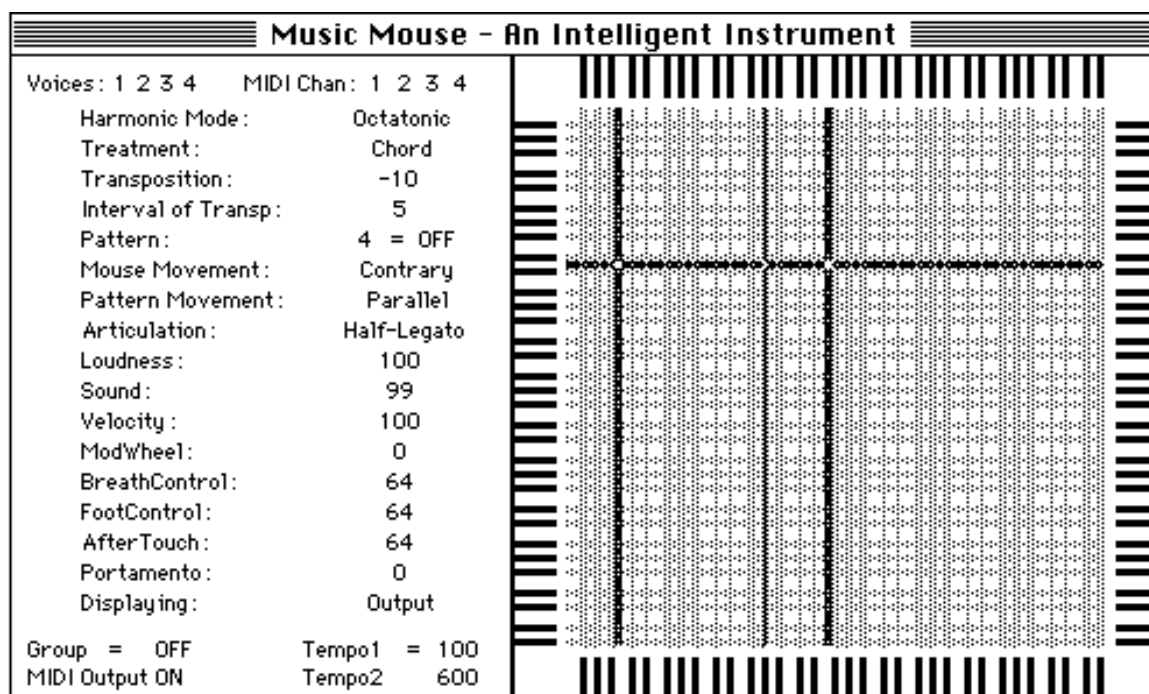


Music Mouse



An Intelligent Instrument



User's Guide

by Laurie Spiegel

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Music Mouse – An Intelligent Instrument

Why Music Mouse? – An Introduction

Up to this time, of the new powers which computers bring to music, commercially available music software has focused mainly on precision and memory. These are wonderful attributes, but one of the computer's greatest strengths remains barely touched. Logic, the computer's ability to learn and to simulate aspects of our own human intelligence, lets the computer grow into an actively participating extension of a musical person, rather than just another tape recorder or piece of erasable paper.

I firmly believe that logic, when used well, does not conflict with intuition, emotion, or other aspects of music which are often considered contrary to it. Rather than constraining musicality, logical structures can serve to support, extend, and amplify our ability to express and embody the undefinable qualities of aesthetic meaning which we are forever trying to capture.

This is a very exciting time for music. With the advent of computers, many of music's past restrictions can begin to fall away, so that it becomes possible for more people to make more satisfying music, more enjoyably and easily, regardless of physical coordination or theoretical study, of keyboard skills or fluency with notation. This doesn't imply a dilution of musical quality. On the contrary, it frees us to go further, and raises the base-level at which music making begins. It lets us focus more clearly on aesthetic content, on feeling and movement in sound, on the density or direction of experience, on sensuality, structure, and shape – so that we can concentrate better on what each of us loves in music that lies beyond the low level of how to make notes, at which music making far too often bogs down.

This simple program hopes to provide an introduction to the vast and still-barely-explored realm of musical intelligence in software which doubtless includes possibilities beyond anything we conceive of now. For those who have wanted to do music but have lacked the background, computer intelligence may make it possible. For those of us who have already gone a long way in music, it may let us go further than we ever imagined before. This program is a small beginning, written to some extent as a pointer.

– Laurie Spiegel

New York City, 1986-8

Music Mouse was written by Laurie Spiegel for Apple Macintosh[™] computers in 1985-6. The Amiga[™] version of **Music Mouse** was implemented by David Silver and Laurie Spiegel in 1986-7.

This update for the Macintosh was released in June of 1988.

What Music Mouse Is

Music Mouse differs from other music programs currently available for small computers in that it is not designed for the storage, editing, and replay of musical compositions using keyboards or involving notation. Instead, it turns the computer itself into a musical instrument which you can play.

Unlike traditional musical instruments, however, **Music Mouse** doesn't require years of practice, or knowledge of music theory or notation. It has a variety of options built into it for harmony and melodic patterning, freeing its player to focus on the movement of melodic lines, the shape and density of their elaboration, their electronic "orchestration", and on the overall form and expressive content of the music itself. It is a controller program designed to let your computer function either as a stand-alone musical instrument, using Macintosh Internal Sound, or as a control interface for MIDI synthesizers, or both.



Though a great deal of attention has been given in recent years to the sonic side of instrument invention, and much variety and wonderful stuff has become available for audio synthesis, there are still very few alternatives for the other half of what we consider a musical instrument to be. That "other half" consists of the structures an instrument provides by which we can interact to control the sounds it makes in musically expressive ways. A musical instrument consists of not only a unique characteristic type of sound, but also of a unique "human interface" to that sound.

A keyboard gives a lot of freedom, but it also has its limitations and aesthetic biases. So does each instrument in its own way. **Music Mouse** is no different in this regard. It has its limitations and biases, its personal strengths and weaknesses. Within its realm of possibilities, however, there is room for an infinite variety of individual player's own statements – your personal sensitivities and ideas, and orchestrated with the endless variety of sounds for which this interface can provide control.

Setting Up and Running Music Mouse

Using Music Mouse with the Macintosh's Internal Sound

You will probably want to connect the Macintosh's audio output jack (below the AC power cable in the back) to your sound system rather than using the speaker in your Mac. The sound quality will be greatly improved. The treble and bass controls on your amplifier can then be used as an extension of this instrument, for control of tone quality. If you have an equalizer, filter bank, reverb or delay line, tape recorder, modular analog synthesizer, or other audio post-processing equipment, you may want to run the Macintosh's output through them for greater control and variety sound. One of the reasons for intelligent instruments is that they let you play a lot of music with one hand, so that the other hand is free to do such other things as controlling timbral post-processing.

The Macintosh puts out a lot of audio level, so if you are connecting it through external audio equipment, you should set the Mac's audio level to 3 or 4, using the "Control Panel" desk accessory. Also, if the level is set low on the Macintosh, it will sound smoother when you fade loudness up and down with the  and  keys.

The program assumes you are using MIDI when you first enter it. To activate the internal sound, select it on the "Output" menu at the right.

Setting up for MIDI

Music Mouse will run with any hardware MIDI interface currently on the market for any Macintosh computer up through the Mac Plus, SE, and Mac II. For those older interfaces or MIDI synthesizers which use other than the now-standard 1 MHz MIDI clock rate, select the appropriate option on the "Output" menu, at the right, after entering the program.





Connect the MIDI OUT cable from your Macintosh MIDI interface to your synthesizer's MIDI IN. (The MIDI cable from your synthesizer's MIDI out running back into the Macintosh is not needed, though it won't bother anything by being there.)

Using Music Mouse with a MIDI Instrument

There are several MIDI instrument types listed on the Output menu. The only difference between them is the way they respond to **Music Mouse's** u and i keys in moving through the preset sounds stored in the instrument. These options are:

Generic MIDI: This is usable for any instrument which steps through its preset numbers sequentially (without numerical gaps like the CZ-101 has) and which doesn't get hung up doing disk accesses along the way (like the Mirage). You have a full range of presets # 1 to 128 (actually 0-127).

Casio CZ-101: The u and i keys will move you through all 32 internal sounds (0-15 and 32-47, in machine talk), then through the 16 cartridge- resident sounds (actually 64-79) and then wrap around back to 1. If you don't have a cartridge, the CZ-101 will interpret 64-79 as 0-15 so you'll seem to cycle through the Preset Sounds twice before getting to the Casio's Internal Sounds.

Ensoniq Mirage: The  and  keys will step you in sequence through the 4 Mirage programs for the currently loaded sounds.  and  let you load sounds from your Mirage disks (3 upper / lower sound combinations per disk).

The availability of certain features may depend on the nature of your MIDI instrument. For example, the program's "velocity" fader keys will have no effect on the Casio CZ-101 which is not velocity-sensitive and whose oscillators are not amplitude-controllable. The program will work with any MIDI synthesizer, but certain features or code usages differ among manufacturers. I welcome any information which would help in customizing **Music Mouse** for additional MIDI instruments.

The results of your actions may also vary with the specifics of the MIDI "voice" (sound definition) you are using. For example, if the breath controller values weren't connected to some parameter of a sound when it was defined, changing the breath controller value from the Macintosh's keyboard will have no audible effect.

Try to be familiar with each MIDI sound you play before you use it. Some **Music Mouse** control values may produce unexpected consequences. For example, if a sound has a very slow attack rate, it may not be audible at all when staccato is selected (with the / key) or if you are playing very fast (and this program can play fast!) because the note releases could occur before the envelope has time to get loud enough to be heard. Some DX7 sounds are only audible above a certain breath or foot controller value, so they'll be silent if these controllers are set too low. A low velocity level may produce a gentle timbre in one sound but may render a different sound completely silent. The program doesn't know how your sounds are defined, so if you don't hear them, before deciding that something's broken, check these values: velocity, loudness, spacebar, legato, breath controller, foot controller, aftertouch, and modwheel (set the various MIDI control values high with the **shift-b m > j l '** keys.). If this doesn't work, you should also try restoring **Music Mouse** to its initial state (press the help key or select "Re-Init" on the "Exit" menu). This should make just about any sound hearable. Also try pressing u then i to reset the sound program in the synthesizer and re-initialize the preset, because sometimes MIDI synths lock up to external control.

The program will work with any number of voices, but it expects your MIDI instrument to have a minimum of 8 voices, which are dovetailed with each other for a true legato (that is, in its default "legato" mode, it releases each of its 4 voices only after another note has been sounded in that same voice). Users of the CZ-101, which can be configured as having fewer than 8 voices, may find that the release stages of some sounds get chopped, a problem which can be fixed by adjusting the CZ's "Line Select" parameter to "1" or "2" so that all 8 of its oscillators are separately triggerable.

Continuous (non-quantized) frequency space and microtonal intervals are not available in MIDI unless your hardware synth has its own way of doing these things local to the instrument itself.

Changing MIDI Channels for Music Mouse Output

When you start **Music Mouse**, all 4 voices will be sent out (polyphonically) on MIDI channel 1. To change the MIDI channel of any of the 4 voices, place the arrow cursor on the MIDI channel number for that voice on the screen display, press the mouse button, and drag the number to the right or left to raise or lower the current output channel. If it's not currently shown, the arrow cursor will re-appear when you move the mouse toward the top of the screen. You may want to press the **delete** key to disconnect the mouse before changing channels, remembering the position of the arrow cursor so you can return to the same location.

Playing Along with Music Mouse on an External MIDI Instrument

Music Mouse was designed so that it can be used as a completely self-contained stand-alone controller for MIDI synthesizers which have no keyboards or other input devices (e.g. the Yamaha TX series or other rack mount units). However, if you prefer to manipulate certain values from your keyboard unit while playing the **Music Mouse**, both sets of controls are "live" at all times. Because your external MIDI keyboard remains "live" in parallel to this program, two people can use it to play together on a single keyboard synthesizer. You can also use **Music Mouse** to amplify your powers as a soloist, playing a full accompaniment with one hand, using the mouse and Macintosh keyboard, to whatever you're playing with the other hand on your MIDI synth keyboard.

Keep in mind that **Music Mouse** only knows about the changes it makes itself, not those you enter on the synthesizer directly. If you move to preset 3 with **Music Mouse's** **i** key then select preset 7 on your unit, when you press **i** again for "next sound", the software will move you to preset 4, not 8 because the program won't have any way of knowing what you changed directly on the instrument.

Patching MIDI Through Music Mouse

When you select "MIDI Thru" on the Output menu, any MIDI data which comes into the computer via its MIDI interface will be merged into **Music Mouse's** MIDI output.

The data produced by your MIDI keyboard, guitar, sequencer, computer, or other MIDI control device will maintain its own MIDI channel when it goes through the program, whether or not that channel is used by any of the **Music Mouse** voices. If **Music Mouse** and the MIDI data which passes through it are not on the same channel, very confusing things can happen if your synthesizer is using "running status" mode, so it is not advisable to use it. If you find problems with "hanging notes" (notes that don't turn off when they should) or missing data, this may be the problem. If you don't have a synthesizer which can be used without "running status" mode, you can get around this problem by playing the synth and **Music Mouse** one at a time, instead of both simultaneously.

1. On tape, like any old fashioned pre-MIDI instrument
2. Using any MIDI sequencer (recorder) external to the Macintosh - on another computer, any stand-alone
3. MIDI sequencer, or the sequencers built into some keyboards.
4. Using the Desk Accessory Tempo to record **Music Mouse** input for later replay (see the section on Tempo at the end of this manual) using either MIDI or the Mac's internal sound.

The program's MIDI output can also be run through any external MIDI delay or other MIDI post-processing device. In short, this program turns the Macintosh into a MIDI

instrument which can be used in all the same ways as any other stand-alone MIDI instrument.

While **Music Mouse** in itself does not currently generate MIDI or SMPTE sync, these sync codes can be superimposed on the program's MIDI output by external equipment which provides them, such as the Emulator II's built-in sequencer or various stand-alone MIDI sequencer, sync, or effects units.

Other Setup Considerations

I recommend using a trackball instead of the standard Macintosh mouse for two reasons. First, a trackball gives finer control and can be moved more smoothly. Second, the regular Macintosh mouse can be connected to it, chaining through, so that 2 people can play music together, one playing on each axis (melody against chords), alternating moves with each other, or in other ways, for example, making up musical games.

There are two major reasons why **Music Mouse** does primarily stepwise melodic movement (as opposed to being able to jump around in the pitch matrix). One is the idea that this melodic bias makes it easier to play lines which sound traditionally melodic than does jumping around. (Stepwise movement tends to sound more traditionally melodic than does jumping around.) The other is the nature of the mouse input device itself, which is the real constraint. This device moves value by value, continuously, as you push it around. (You can get non-stepwise movement by holding down the mouse button between notes, but this overrides the mouse's basic nature. What it does is to signal position changes to the computer, one pixel at a time, in any of 4 directions.)

If anyone wants to build them, alternative control devices which would plug into the mouse port, such as a pitch matrix tablet with a random-access stylus, or a touch sensitive screen overlay, could provide alternative methods of movement for the program's pitch space. Any device which you can buy or make and which plugs into the Macintosh's mouse port and which provides similar values to the mouse should work, and may give you truly alternative ways to play this instrument, to move around in the musical space which **Music Mouse** provides.

The fade rates, on all the fader keys, depend on the Macintosh's repeat-key rate which you can set by using the "Control Panel" desk accessory.

Playing A Music Mouse

The Mouse

Music Mouse is designed to let you play melody and harmony by moving the mouse with one hand while changing control and interpretive parameters from the Macintosh's keyboard with the other hand. The x-axis and y-axis of the mouse each move a separate and completely independent melodic line, and the software supplies 2 additional melodic lines of music, for a total of 4 voices. The 2 software-supplied melodic lines move in various ways relative to the 2 lines directly under control of the mouse, depending on which keyboard options are currently selected.

If you want to move from one pitch place to another without generating all the notes along the way, hold down the mouse button. This will suspend the playing of notes until the button is released in whatever new location you choose. Pressing and releasing the button will cause the repetition of whatever notes were played the last time the mouse was moved.

The Polyphonic Cursor and Pitch Display

When you move the mouse to change the pitches, you'll see 4 bars on the screen moving with you. These bars are what I call a "polyphonic cursor". (Traditionally in music, the word "polyphonic" refers to multiple independent lines of motion, not just multiple sounds at the same time). Each of these 4 cursor bars points to one of the 4 pitches you are hearing, as displayed on the piano keyboard images which form a border around the screen. The lowest notes are at the bottom and on the left of the screen and the highest are at the top and right.

The standard arrow cursor will magically appear when you need it, when you move to the top of the screen to use the menus.

The Keyboard

Musical instruments should put as little time or effort as possible between you and where you want your music to go, and **Music Mouse** is an instrument played with both mouse and keystrokes. (In fact, you can make a lot of interesting music just pressing keys without moving the mouse at all, and I often play primarily from the keyboard.)

Since use of key combinations or menus would reduce your ease and speed in playing music, the use of the Shift and Command keys has been kept to a minimum, and I have tried to reserve them for less frequent or time-critical functions. If you have an "Extended Keyboard", you will find single-stroke equivalents for most key-combinations. (Menus are reserved for purposes primarily of overall configuration rather than performance.)

In designing the keyboard layout for **Music Mouse**, I assigned certain keys certain meanings because the characters printed on those key made mnemonic sense (made their meanings easier to remember). If these happened to be uppercase usages, it didn't matter. "<" and ">" make more sense for loudness controls than do "," and "." but the same physical keys are involved either way. When this manual refers to keys by their letter-names, it is talking about the physical key on which that letter name is found, not the actual letters. When the "shift" key is needed in combination with any other key, this manual will explicitly say so by referring to the key character as "**shift-x**".

The Macintosh keyboard is a "dumb keyboard". That is, it has no internal intelligence of its own, and only keeps track of one key at a time. If you're holding down a fader key (see "Types of keyboard Controls" below) or an oscillating switch and you hit a second key, the fade or strobing will suddenly stop as control goes to the new key. If you want to do a crossfade, or continue a fade-up after changing some other option, you'll need to release the fader key and press it again, to make it the last key down again.

The fade rates on fader keys and the oscillation rates on of toggle switch keys all depend on the Macintosh's key repeat rate. You can adjust this on the Macintosh's Control Panel.

The values and states of the various options present on the keyboard (see below) are shown on the left side of the screen.

The Menus

Unlike other kinds of computer applications, musical instruments need to give their users immediate moment-to-moment access to all controls, and pull-down menus are too slow and indirect. Also, the mouse is always in use for pitch selection, so using it at the same time as trying to get options which are on menus could force you into some very strange melodies. If you do need to change something on a menu after you've started playing, you can silence the voices with **spacebar** temporarily disconnect the mouse using the **delete** key.

In General

Each of **Music Mouse**'s features is fairly simple to comprehend, memorize, and operate by itself, but their many possible combinations can produce a tremendous amount of variety, and it can seem complicated or become confusing if you aren't sure what each of the controls does by itself in the first place. It's a good idea to try each of the controls (keys) listed in this manual, one at a time (you might try running through them pretty much in the order in which they are described below, to get a clear idea of what each key does individually). This program - by its unusual nature - may suggest new musical ideas to even the most experienced musicians.

Although this software instrument is easy to play from the very first, it is also a real instrument that can be played better or worse, and on which real expertise can be achieved by thorough exploration and extensive practise.

It's a good idea to practice moving the mouse slowly and gently at first, until you get a musical feel for how the sounds respond. Move in small motions, listen to the way the musical voices move in relation to each other, and go in the directions the sounds seem to want to lead you. Fade the faders up and down to get a feel for their rates and curves (start with < and >). Practice playing a melody against a drone by moving the mouse up and down without moving sideways. (This is not as hard as it sounds because the mouse's movement is quantized by the software). Try moving slowly and smoothly along a rambling diagonal toward the upper right or lower left, moving roughly staircasewise, alternately in the horizontal and vertical directions most of the time. Try repeating patterns (small circles or other shapes) until you feel like breaking out of them and moving freely. Try the same one-dimensional pattern first on one axis then on the other (alternating, for example, left 2, right 3, down 2, up 3, or others).

After you've studied the list of controls below and tried each of them, try such motion exercises with each of the harmonic modes selected, with different sounds, and at different tempos. Whatever you do, the software will do what it can to make the pitches you hear work together and sound musical in terms of harmony, and to get them to lead you further.

Music Mouse is essentially an instrument for logically supported improvisation, and in improvisation, at least as much as in any other form of musical art, a vital part of the art is in developing your ear and listening. To the degree that this instrument makes playing lots of notes absurdly easier than traditional instruments do, the art of playing it well has that much more to do with its player's moment-to-moment sensitivity, awareness, and openmindedness to what the sound of the moment suggests. Listening to the music as it happens, and pacing - timing - what you do moment to moment in response, are much more essential parts of an art which presumes technical mastery of note playing. The choice and timing of what to generate are everything.

Music Mouse Keyboard Controls

There are 11 main groups of controls available on the keyboard. The specifics of each group are described in the following sections.

Throughout this manual, keys will be referred to by what's printed on them. For users with extended keyboards, single-key equivalents are given for certain functions which would require key combinations on the standard Macintosh keyboard. These extended keyboard equivalents are given in parentheses after the standard keyboard key combination.

| Group | Member Keys |
|---|--|
| 1 - General Controls | help , delete , cmd-a |
| 2- Types of Harmony | tab q w e r t y , cmd-q w e r t y |
| 3 - Transposition | z x c , cmd-z x c , shift-z x c |
| 4 - Addition of Melodic Patterning | a 1 2 3 4 5 6 7 8 9 0 |
| 5 - Voicing (relationship between the 2 mouse axes or added patterns and the 4 melodic lines) | s d f g cmd-d cmd-f |
| 6 - Loudness, Articulation, and Muting | spacebar < > / shift-/ shift-1234 ~ ` |
| 7 - Tempo | - + [] \ shift-\ |
| 8 - Rhythmic Treatments | cmd-1 cmd-2 cmd-3 cmd-4 (F1 F2 F3 F4) |
| 9 - Internal Sound Selection | u i o |
| 10 - MIDI Sound Selection and Control | v b , h j , n m , k l , ; ' , u i , o p , shift- (any of) v b , h j , n m , k l , ; ' , u i , o p |

Look at your Macintosh keyboard and visually locate each of the above groups on it. Some of the choices as to which letters represent what musical meanings may seem a bit arbitrary and difficult to remember at first glance, but the functions were placed and grouped on the keyboard so that related controls fit well under the hand for performance. You'll find they are actually very quickly memorized and easily used.

In general, the keyboard is laid out so that pitch content determining options are toward the left and orchestrational (sonic) controls are toward the right.

You'll probably want to look at the Keyboard Map which was enclosed with your copy of the program while going through this manual and tutorial, and to keep it in front of you until you've memorized the controls (which usually doesn't take long!).

Types of Keyboard Controls

Different keys on the Macintosh keyboard are programmed to act in different ways, in simulation of different kinds of physical control devices. Each key or key group described on the following pages is identified as being of one of these types:

| | |
|------------------|---|
| selector | Selector keys are members of "multiple choice" groups, for choosing one of a group of possibilities. Only one member of any selector group is in use at any time. A selector group functions similarly to a menu but is faster to use. |
| switch | <p>A switch key moves some value back and forth between two states on alternate key-presses (it toggles). Some switches turn their option alternately on and off, much as a light switch does. Others switch between two states (see /, f, d or others, below). Holding a switch down for more than the duration of a normal keypress will produce a rapid alternation, which may be musically useful in some cases, and musically undesirable in others.</p> <p>For example, you can get a very nice tremolo by holding down f, but if you hold down the spacebar for more than a normal key-hit's-worth of time, you won't know until you move the mouse again whether you've left yourself in a "sound" or "silent" state.</p> |
| fader | <p>A fader moves a value one step higher or lower if pressed once in normal text-typing fashion. If held down, it will continue to move the value further in the same direction until it is released. Faders always occur in pairs on the keyboard, with the left key decreasing and the right key increasing the value.</p> <p>Faders clip, rather than wrapping around, at their extreme values. (That is, they will stay at their highest or lowest value after they've reached it even if they're still held down). Because of the Macintosh keyboard's design, (alas) only one fader can be active at a time. When a second fader is pressed while another is still held down, control is immediately transferred to the second one.</p> <p>True crossfades are not possible, but must be done by alternately pressing and releasing the two faders involved. The program's fade rates are designed for slow smooth transitions. Their fade rates are changeable from the Mac's "Control Panel".</p> <p>Faders always occur in pairs on the keyboard, with the left key decreasing, and the right key increasing, the value controlled by the pair.</p> <p>The uppercase (shift-key) version of a fader will set its value to its extreme: to zero for the left shift-key combination of the fader pair and a high or maximal value for the right key of the pair.</p> |
| cycler | Cycler keys move values repeatedly through a range. When a cycler reaches the extreme value in whichever direction it is moving (to the bottom or top of its range), it drops back to a less extreme value so it can continue moving in the same direction, and it will do this over and over as long as it is held down. Like faders, cycler keys move only one step each time they are pressed in a normal typewriting manner, and they continue moving as long as they are held down. |
| specifier | A specifier sets a parameter to a specific pre-defined value – for example, to restore it to where it started after it was changed by action on other keys. |

Music Mouse Keyboard Usage

General Notes: The x's under the words MIDI and Macintosh in the charts below indicate whether each option is present for that kind of output. (Macintosh refers to the Macintosh's internal audio, which has different capabilities from MIDI and therefore has different controls.)

The keys listed in the following tables are all single-keystroke lowercase keys unless explicitly prefixed with **shift-** or another combination key.

A lot of very interesting music can be made by just using the keys listed in groups 2 through 6, with hardly a mouse move at all at any time. You'll find that use of the possibilities available in doing this do benefit considerably from practice and familiarity, and (particularly) from listening.

1 – General Controls

Initial Setting: Mouse = Active (connected). Pattern cursor = ON.

| Key | MIDI | Mac | Type | Parameter |
|---------------|------|-----|----------|-----------------------------------|
| delete | x | x | switch | Disconnect mouse from music. |
| cmd-a | x | x | switch | Display mode. |
| help | x | x | selector | Re-Initialize all program values. |

The **delete** key de-activates the mouse for playing notes. It effectively disconnects the mouse from the music, so that you can lock in what what you have happening musically, such as a pattern playing, and can move around and use the menus without dragging the music along with you. Though disconnected from your mouse movement input, **Music Mouse** will still be running and can go on playing music, and the alphanumeric keyboard will remain live. You can see when the mouse is de-activated: the music display area on the right side of the screen is inverted in color. To reconnect the mouse just press the **delete** key again.

The Display Mode switch on the **cmd-a** key lets you see either where the mouse is or the individual notes you hear as they are played (your input into the program or the program's output). With Added Patterning (the **a** key) turned on or using any rhythmic treatment besides Chord mode, these will not be the same. Normally, you'll probably look at the output, the notes you hear.

There are 2 main reasons to look at the notes at your current mouse position. First, if you want to run **Music Mouse** at very high speeds with the added patterns on, you'll want to turn it off because the extra graphical display work slows the program down considerably. You can't show all the notes and still go full speed. Second, you'll be able

to more accurately control the harmonic content of the melodic pattern textures if you look at your mouse position, which shows the base chord on which the patterns rest, rather than looking at the musical output built over that base chord.

2 – Type of Harmony

Initial Setting: Harmony = r (tonal).

| Key | MIDI | Mac | Type | Parameter |
|--|------|-----|----------|---|
| tab | | x | selector | Pitch quantization defeat. For microtonal frequency space, and pitchbend using left mouse button. |
| q | x | x | selector | Equal tempered scale, Chromatic harmony. |
| w | x | x | selector | Octatonic mode. |
| e | x | x | selector | Middle Eastern scale(non-microtonal approximation) |
| r | x | x | selector | Diatonic scale, Tonal harmony. |
| t | x | x | selector | Pentatonic scale, Modal harmony. |
| y | x | x | selector | Cycle of fourths, Quartal harmony. |
| cmd- (any of q w e r t y) | | | | Same as q w e r t y but will not cause the notes to be played. |

Each of the keys in this group will change the current harmony type, figure out the new notes for the current mouse position, display them, and - unless doubled with the **cmd** key, also immediately play the new pitches in any voices whose pitches have changed (or in all voices, if **g** is on - see below).

To make the order of the above easier to remember, notice that they are organized on the Macintosh's keyboard from left to right in order of decreasing resolution, with more pitches per octave toward the left and fewer per octave toward the right.

Pressing the currently-selected harmony key will repeat the current notes (the last notes played). Holding it down will create a tremolo effect (a fast even repetition).

Extremely interesting harmonic sequences can be produced by going back and forth among the different types of harmony, between or during mouse moves, especially after you get a feel for how the harmonies move, when you change from mode to mode, on each of the different scale degrees.

The standard polyphonic cursor disappears in non-quantized (**tab**) pitch space (Macintosh sound only) because there exists no alignment between the pitches you

can play and the equal-tempered chromatic scale represented on the screen. In this mode, your ear is the best guide.

In **tab** mode, you will get microtonal pitches wherever you move. For more perceptually continuous pitch movement, try this using legato instead of staccato articulation, and with the tempo set fast (hold down "+").

3 – Transposition

Initial Setting: Transposition = zero (C major / A minor), Interval of Transposition = 1.

| Key | MIDI | Mac | Type | Parameter |
|----------------|--------------------|-----|-----------|---|
| z | x | x | cycler | Pitch quantization defeat. For microtonal frequency space, and pitchbend using left mouse button. |
| x | x | x | cycler | Equal tempered scale, Chromatic harmony. |
| c | x | x | specifier | Octatonic mode. |
| shift-z | x | x | fader | Middle Eastern scale(non-microtonal approximation) |
| shift-x | x | x | fader | Diatonic scale, Tonal harmony. |
| shift-c | x | x | specifier | Pentatonic scale, Modal harmony. |
| cmd-z | (quiet transition) | | | Same as z but does not cause the new notes to be played. |
| cmd-x | (quiet transition) | | | Same as x but does not cause the new notes to be played. |
| cmd-c | (quiet transition) | | | Same as c but does not cause the new notes to be played. |

The "interval of transposition" is the number of semitones you will move each time you press **z** or **x**, to transpose the music up or down in pitch. Starting in C natural, if you press **x** once, you will have moved to C-sharp if your interval of transposition is 1. If it is 2, you will have moved to D natural.

These keys do actual transposition, not just retuning, as in keyboard synthesizers which slide the pitches of the notes you hear back and forth relative to the black and white keys you use to play them. For example, after you press the **x** key 3 times, when a cursor beam points to middle-C on the screen-border pitch display, you will still be hearing middle-C, not some other note. But that C will function as the tonic of the key of C Minor instead of C Major. The triad based on D, which was minor before, will now be diminished, and the next chord higher than that will now be E-flat major, instead of E- natural minor, as before. (C Minor is the relative minor key of E-Flat Major, whose tonic is 3 semitones higher).

Because the **shift-** key version of each of these keys changes the number of semitones by which the harmony template will be moved on each single normal lowercase (or **cmd-**) keypress, some wonderful harmonic-melodic effects can be achieved by use of these keys. If you want to transpose by fourths instead of semitones, for example for normal modulation to (traditional) harmonically related keys, do 4 **shift-x**'s, and the next time you press either **z** or **x** you will move down or up by a perfect fourth. Then do 1 **shift-x**, hold down **z** or **x**, and you'll be scanning up or down augmented triads.

These **shift-** combination keys will have no audible effect until one of the other keys in this group is pressed, as they modify the behavior of other keys instead of directly affecting the music.

4 – Addition of Melodic Patterning

Initial Settings: Addition of patterns = OFF. Pattern = 6.

| Key | MIDI | Mac | Type | Parameter |
|----------------|------|-----|-----------|---|
| a | x | x | switch | Add melodic patterning. |
| 0 . . 9 | x | x | selectors | Select melodic pattern to be heard if "add patterns" is on. |

The **a** key turns on and off a mode in which a series of pitch intervals is added, one at a time, to the notes at your current mouse position. This is done at the current tempo.

If **a** is off, pressing any of the number keys will have not have any effect on what you hear until a is pressed to switch added patterning on.

You can play phrases and ornaments by turning a on briefly for just a very few notes, then turning it off again, or you can let the patterns run, and create variety by switching among them, changing Harmony Type, rhythmic Treatment, Voicing, timbre, or in other ways.

Some of the Treatments in combination with this a feature, particularly **cmd-3 (F3)** and **cmd-4 (F4)**, allow **Music Mouse** to act like a generative system (a process that can create music on its own). But it's still basically a performance instrument, and the challenge of playing it is fundamentally the same: What to change and when. A major difference between playing notes by hand with the mouse and interacting with an automatically generated note stream is that when the problem of keeping the music going has been taken care of for you, the emphasis falls on the problem of creating meaningful change through your performance on a compositional level, on how and when you vary this ongoing music stream. The materials which **Music Mouse** generates on its own are meant for human interaction. Though often pleasing for a while when left running, they are not expected just to be left running indefinitely. There

is nothing within this program to create overall compositional form or spontaneously change things. That's up to you.

Because **Music Mouse** works in 4 part harmony, the patterns selectable on the number keys represent both melodies and chord progressions. By using the Voicing and the Muting keys (see below), you can bring in and out the various interlocking parts (melody, inner voices, bass), and change their interrelationships.

When changing keyboard options while the patterns are running, you may want to use the **cmd-** key variations of the pitch-determining keys to suppress extraneous notes that may not fall rhythmically where you want.

The 10 different melodic contours which you select with keys **0-9** are represented in software as abstract patterns of intervallic motion, as shapes, curves, rather than as specific notes or exact intervals. They have no inherent pitch or intervallic content. When they are used (played), these contours are translated into different actual pitch intervals by the software, depending on various factors: the current type of harmony (**qwerty**), the current scale degree (the location of the mouse within the octave - relative to the tonic - after compensating for transposition), and each current voicing option (see **s**, **d**, and **f**; see below). Once the specific intervallic content is computed for an instance (a single use) of one of these generic patterns, the actual pitches are figured out for the current transposition (**z**, **x**, and **c**) and played.

Here is a list of the ten melodic patterns built into **Music Mouse**. The numbers do not represent pitches, semitone content, or specific pitch intervals. These number series represent contours which are added to the base-level mouse-selected pitches. Each of these patterns can take on many final forms, depending on how you set the program's various pitch-governing options. I sometimes refer to them as "generic patterns" since each can exist in many four-voiced manifestations.

(The number of possible specific pitch content results which can be generated for each of these patterns equals: 6 harmony types on "**qwerty**", times 12 possible transpositions per octave on **z** and **x**, times 2 mouse symmetries on **d** times 2 pattern symmetries on **s**, times 2 voicings of the **f** key, times 2 grouping statuses on **g**; this equals 1152 possible patterns, which should then be multiplied by the number of scale degrees the mouse may rest on within the currently selected harmony type, and 4 possible rhythmic treatments. So it's quite a few transformations.)

| | | |
|----|---------------------------------|------------------------------------|
| #1 | 0 4 5 0 4 3 4 5 0 4 | (10-note cycle) |
| #2 | 0 2 4 7 4 2 | (6-note triadic arpeggio) |
| #3 | 0 1 2 3 4 3 2 1 | (8-note cycling scale) |
| #4 | 0 1 2 3 4 5 6 7 6 5 4 3 2 1 | (14-note cycling scale) |
| #5 | 0 4 7 11 7 4 7 4 | (8-note extended triadic arpeggio) |
| #6 | 0 1 0 1 2 1 2 3 2 3 4 3 2 3 2 1 | (16-note stepwise cycle) |
| #7 | 0 2 3 4 5 6 5 4 5 2 | (10-note cycle) |
| #8 | 0 7 1 6 2 5 3 4 4 5 2 6 1 7 | (16-note cycle) |
| #9 | 0 1 4 1 0 4 0 4 | (8-note cycle) |
| #0 | 0 7 0 0 2 1 2 4 3 4 2 1 2 0 0 0 | (16-note cycle) |

5 – Voicing

Initial Settings: Parallel mouse motion. Parallel pattern movement. Chord-Melody format. Grouping = OFF.

| Key | MIDI | Mac | Type | Parameter |
|----------------|--------------------|-----|--------|--|
| s | x | x | switch | Symmetry: Parallel / Contrary motion switch for the patterns a adds to the four voices. |
| d | x | x | switch | Direction: Parallel / Contrary motion switch for the mouse controlled pitch lines. Plays new notes when pressed. |
| f | x | x | switch | Format: Toggles between two ways of voicing: Chord-melody(solo voice on mouse y-axis and 3-note chord on x-axis), or Voice-pairs (two voices on each axis). |
| g | x | x | switch | Grouping: When on, all four voices always sound together. When off, each of the four voices sounds only it has a new pitch. |
| cmd - d | (quiet transition) | | | Same as d but does not cause the new notes to be played. |
| cmd - f | (quiet transition) | | | Same as f but does not cause the new notes to be played. |

As with the harmony and transposition keys discussed above, pressing either the **d** or **f** keys will cause the computation of new pitches from the current mouse position, and any new pitches will be played immediately. Because these keys play notes as well as setting their respective options, if they are held down, they will oscillate between the different pitches computed for their 2 alternative states, providing tremolo effects.

In parallel motion, the voices on each axis move in the same direction as each other. In contrary motion, 2 voices on the same axis move in opposite directions to each other.

If **g** is off, only the voices which have pitch changes will be sounded. With **g** on, all 4 voices are sounded whenever any of them get a new pitch. This produces a much fuller tremolo effect from the oscillations created by holding down **f**, because all 4 pitches will sound at every value reversal.

When **s** or **d** are enabled, and any two voices which form a contrary-moving pair move into unison (meet each other on the same note), their cursors will disappear from the screen, making the unison easy to spot.

s will have no audible effect while **a** is turned off. It will be easier to hear what **s** does if you set **f** so that there are two voices on each mouse axis, and then line up both voice pairs at their unisons (so that their cursor lines disappear). Then turn **a** on and listen to what **s** does, with the Pattern Cursor on so you can see it too.

6 – Loudness, Muting, and Articulation

Initial Settings: Legato.
 Legato Mode = Full Legato.
 MIDI Loudness = 99(on a scale of 0 to 127).
 Macintosh Sound Loudness = 10 (on a scale of 0 to 10).
 Macintosh Sound = OFF.
 MIDI = ON.
 Muting = OFF for all 4 voices.

| Key | MIDI | Mac | Type | Parameter |
|-------------------|------|-----|-----------|---|
| / | x | x | switch | Staccato / Legato. |
| shift-/ | x | x | switch | Legato mode = Half Legato / Full Legato. |
| < | x | x | fader | Quieter. |
| > | x | x | fader | Louder. |
| shift-< | x | x | specifier | Loudness = 0. |
| shift-> | x | x | specifier | MIDI Loudness = 99. Macintosh Loudness = 10. |
| spacebar | x | x | switch | Sound / silence. |
| shift-1 | x | x | switch | Horizontal voice muting. |
| shift-2 | x | x | switch | Variable-axis voice muting. |
| shift-3 | x | x | switch | Vertical second voice muting. |

| | | | | |
|----------------|---|---|--------|---|
| shift-4 | x | x | switch | Vertical lowest voice muting. |
| shift-~ | x | x | switch | All voices on (not muted). |
| ~ | x | x | switch | Muting reverse (all voices on turn off and conversely). |

Extended keyboard equivalents – on **Numeric keypad**:

| | |
|----------------|------------------------------|
| 0 1 2 3 | Muting for individual voices |
| dot | Muting Reverse |
| enter | All Voices On. |

In **Music Mouse**, a Staccato note is released as soon as it is played. A Half Legato note is held for a full beat and then released on the next beat at the current tempo. A Full Legato note is not released until another note needs to be sounded in the same voice (regardless of how much shorter your MIDI or Macintosh envelopes may make Full Legato notes seem).

shift-/ determines which of the 2 types of Legato will be alternated with Staccato on **/** keypresses. If you're in Staccato when you press it, you'll be switched to whichever Legato mode you've chosen.

Half Legato is particularly valuable when using Improvise mode (see Treatments, above) with **a** turned on, as it makes the voices sound more rhythmically independent and gives them more of a contrapuntally imitative feel.

The uppercase and lowercase versions of the fader pair **< >** function like all the other fader pairs (see Types of Keyboard Controls above, and the section below on MIDI Controls).

Hitting the spacebar to turn sound back on after it has been silenced will not immediately result in sound. A new sound will not be heard after the sound has been turned back on with the spacebar until the mouse is moved again, or one of the pitch-controlling parameters is used on the keyboard, or unless **a** is on.

Sounds with long attacks may not be audible in staccato mode, since the software may release their envelopes before they've had time to open up to the level at which humans can hear them. This should not be a problem, as long as you know your sounds, but it does produce a very useful side effect: If you set up **Music Mouse** to play sounds with long attacks (such as strings) and sounds with short fast attacks (such as a piano or percussion) at the same time, toggling the **/** key will seem to turn the slow-attack sounds on and off without affecting the fast attack sounds, which will remain constantly on. You can use this to bring a background texture in and out at will while playing a solo part, and for other musically useful effects.

7 – Tempo

Initial Settings: Basic Tempo= 100 quarter notes per minute.
 Alternate Tempo = 200 quarter notes per minute.
 Current Tempo = Basic Tempo.

SLOW = 50 quarter notes per minute.

FAST = 200 quarter notes per minute.

DEFAULT = 100 quarter notes per minute.

| Key | MIDI | Mac | Type | Parameter |
|---------|------|-----|--------|-------------------------------------|
| - | x | x | faders | Basic Tempo slower. |
| + | x | x | faders | Basic Tempo faster. |
| shift- | x | x | faders | Set Basic Tempo to SLOW value. |
| shift-+ | x | x | faders | Set Basic Tempo to FAST value. |
| [| x | x | faders | Alternate tempo slower. |
|] | x | x | faders | Alternate tempo faster. |
| shift-[| x | x | faders | Set Alternate Tempo to SLOW value. |
| shift-] | x | x | faders | Set Alternate Tempo to FAST value. |
| \ | x | x | switch | Use Basic / Alternate tempo. |
| shift-\ | x | x | switch | Set current tempo to DEFAULT value. |

Music Mouse quantizes time to even rhythmic units. These determine the rate at which notes are computed from your mouse location and played, or generated by the **a** automatic patterning function. The tempo numbers given above tell you how many "quarter notes" will be played per minute at the current rate (tempo, or speed), assuming a quarter note to equal four **Music Mouse** beats. (These values think of a **Music Mouse** beat as a sixteenth notes.) The tempo numbers displayed are approximate, not exact, and cannot be counted on as accurate at fast tempos if the Pattern Cursor is turned on.

At the fast end of the tempo range, if you turn on a, that's so many notes per second that they can blend into a dense texture, depending on the sound and the pattern in use. Such textures can be manipulated in quality with virtually every other controller on the instrument, one way or another. (Try changing pitch selection and voicing options, for example.) At these rates, the velocity and MIDI controller faders can be used to create wonderful timbral and textural transitions with MIDI sounds. You'll need to use sounds with very short attacks to be audible at top speed with a on, and the results you get will depend to a significant degree on the nature of your synthesizer and sound. Not all MIDI synths can keep up with **Music Mouse**.

All keyboard controls, **0-9**, **qwerty**, **zxc**, **s**, **d**, **uio**, **/**, **f**, and **<>** are useful in creating controllable variety within these textures, and old fashioned "classic sci fi" electronic sounds and dense electronic textures can be made by using them at these update rates.

The display shows you which of the 2 tempi you are using, basic or alternative, by moving the "=" sign to which ever is currently in use.

The **shift-** combinations of the tempo faders set the program to half and twice the default speed.

You can adjust the value of either tempo at any time, whether it is the active tempo or not, and see it displayed as you change it, so that you can set a specific tempo and jump to it exactly while playing.

8 – Rhythmic Treatments (Temporal Distribution of a Chord)

Initial Setting: Chord mode.

| Key | MIDI | Mac | Type | Parameter |
|----------------|------|-----|----------|--|
| cmd - 1 | x | x | selector | Chord Mode (Play chord as a block.) |
| cmd - 2 | x | x | selector | Arpeggiate. (Subdivided tempo by 4.) |
| cmd - 3 | x | x | selector | Line mode. (Distribute over 4 beats.) |
| cmd - 4 | x | x | selector | Improvise mode. (Limited rhythmic independence.) |

Extended keyboard equivalents: **F1 F2 F3 F4**

These controls let you select among various rhythmic treatments for the current chord, whether that chord is produced by movement to a new mouse location, by any of the pitch-governing keys (**q w e r t y, z x c, d f**), or by the **a** (added, or automated) patterns. The chord, arpeggiate, line, and improvise modes are mutually exclusive of each other (multiple choice - only one at a time).

In Chord mode, all the notes of the chord are played simultaneously.

In Arpeggiate, the basic tempo is subdivided by 4 (for the 4 notes of the chord) and the individual pitches are played in sequence through the voices.

Line mode operates like Arpeggiate except that the pitches to be sounded are distributed over 4 successive beats at the current tempo, instead of at a subdivided tempo 4 times faster.

Improvise mode uses the same timescale as Line mode, distributing the notes to be played over 4 beats. But **Music Mouse** decides on its own initiative how many notes from the current chord it will play at once on each of the 4 beats. It does this each time the chord changes, whether from mouse movement, keypresses, or added patterns.

The voices which have still not yet played their new notes as of each passing beat of the 4 beats remain at their previous pitches, creating harmonic suspensions and contrapuntal effects. Harmonic suspensions and limited melodic imitation occur in the upper voice(s) on each axis, with that axis's bass note falling at (or soonest after), the downbeat of the chord. To get a clearer idea of what this Treatment does, try it with **a** on, and use **shift-1** and **shift-3** to mute 2 of the voices to make it simpler and clearer what's going on.

9 – Internal Sound Selection

Initial Settings: Internal Sound is OFF (select on "Output" menu to turn it on).
Initial sound = Square Wave.

| Key | MIDI | Mac | Type | Parameter |
|----------|------|-----|----------|------------------------|
| u | | x | selector | Use triangle waveform. |
| i | | x | selector | Use squarewave. |
| o | | x | selector | Use sawtooth wave. |

If you have turned the sound off with the spacebar, pressing any of the three waveform selector keys will turn the sound back on again.

10 – MIDI Sound Selection and Control

Initial Settings: Sound # (preset #) = 1.
(Each of these values is on a scale of 0 to 127).
Velocity = 99.
Modwheel = 0.
Breath controller = 0.
Foot controller = 0.
Aftertouch = 0.
Portamento rate = 0.

| Key | MIDI | Mac | Type | Parameter |
|----------|------|-----|--------|---|
| u | x | | cycler | Step back to next lower MIDI sound number (preset). |
| i | x | | cycler | Step forward to next higher MIDI sound number. |
| o | x | | fader | Portamento shorter. |
| p | x | | fader | Portamento longer. |
| v | x | | fader | Lower the current "velocity" value. |
| b | x | | fader | Brighten the sound quality, make it louder, etc. by raising the "velocity" value. |

| | | | | |
|---------------|-----------------------|--|-------|---|
| n | x | | fader | Lower the MIDI "modwheel" value. |
| m | x | | fader | Modwheel value higher. |
| h | x | | fader | Lower the MIDI "breath controller" value. |
| j | x | | fader | Breath controller value higher. |
| k | x | | fader | Lower the MIDI "foot controller" value. |
| l | x | | fader | Foot controller value higher. |
| ; | x | | fader | Lower the MIDI "aftertouch" value. |
| , | x | | fader | Aftertouch value higher. |
| shift- | (any above) specifier | | | Set extreme extreme values: Left key of pair sets value to 0. Right key sets value to 99. |

When you turn on MIDI on the "Output" menu or press **he lp** to restore the program's initial state, **Music Mouse** doesn't know anything about the state of your MIDI synthesizer until after it sends it some values (after which it remembers what it last told the instrument to do and therefore knows what state the instrument is in). When you enter the program, **Music Mouse** doesn't want to change your instrument's current settings until you tell it to because you might already have everything set exactly the way you'll want to play it. So when the program is first entered, it just assumes that vibrato and portamento are off, that the current MIDI voice is #1, and that all the continuous MIDI controllers are set at zero, which is the most likely situation. This means that the first time you use each of these control keys on a MIDI instrument, each of these controller values will have to be brought up by you from zero if you want to be able to move smoothly later from a higher value.

This means, for example, that the first time you try to fade up a the channel loudness (for example), it will be incremented from zero to 1 then 2 then 3 ... If it was at within your synth 99 before you did so, it will therefore seem to suddenly jump all the way down. Or if you press i to move to your next sequential MIDI preset, you will find yourself on sound #2 the first time regardless of what preset your synth was playing before. After the first time you use any MIDI control key in **Music Mouse**, your synth and the program will be in sync in terms of numbers and the results will be consistent.

With the exception of velocity, none of the above MIDI control values are changed by the program at any time except when you specifically change them from the Macintosh keyboard. Unlike other **Music Mouse** controls, they are not set when you enter the program, re-initialized by **he lp**, or changed when you select a new MIDI instrument on the "Output" menu. The program will leave the 4 MIDI controllers set up however you have left them unless you specifically change them yourself.

The **u** and **i** keys will move you through different series of sound preset numbers depending on which MIDI instrument type is currently selected on the Output menu. (See the section on Using **Music Mouse** with MIDI, near the beginning of this manual.)

Each of the various MIDI controller values available on the Macintosh keyboard will always be sent out on all four of the channels whose numbers are shown. Preset changes will not be sent out on those channels whose voices are muted, so that you can change the presets on your different MIDI instruments from the **Music Mouse** keyboard selectively.

The portamento rate controls will have no effect if portamento has been turned off at your MIDI synthesizer. You can turn it back on by reselecting your MIDI instrument type on the Output menu.

The **shift-** commands do the equivalent of an instantaneous fade to the extreme of the value that their lower case versions control. They make it much faster to set controller values on and off, for example to zero any of the controller values after you switch to a new sound that doesn't want them, or to "punch" in a sound whose loudness is controlled by one of them.

Note that MIDI velocity is initialized (and set with **shift-v**) to 99 instead of the full 127 and likewise that each of these controller values is raised only to 99, not the full 127, by its **shift-** upfader. Some common MIDI keyboards and other controllers fall short of the maximum MIDI velocity (127) which **Music Mouse** can produce. Certain sounds may therefore sound brighter and exhibit a larger dynamic range when played from this program than from such keyboards. Others may sound noisy, harsh, and ugly at full velocity because they weren't meant to be played at such levels. Another reason for setting only to upper midrange is that if you punch in a control value at full maximum, there is no headroom left to grow. I find it more musically workable to jump to upper midrange and still have room to make a build-up (of whatever type) by fading further.[!]

The DX7 family of synthesizers, and some others, can be set up so that any of the controls listed above can be used to control the overall loudness of a sound and/or the harmonic content of its tone. Consequently, some sounds may be inaudible when you first try playing them from **Music Mouse** because a controller on which that sound depends has not been faded up. Other sounds may be timbrally distorted from the way they sound on keyboards. **Music Mouse** doesn't make any decisions about how any of these controller values are going to be used by you or your outboard MIDI equipment (maybe you're using this program in place of a dimmer panel for lighting control?). It doesn't know how your sounds are defined. It just gives you a way to manipulate these values, whatever you find them to be good for. They can provide wonderful old-fashioned voltage-controlled filter sweep effects, mixing, or panning. Or they can hang you up. So be aware of them.

All types of faders are available and "live" at all times via this program, so just play with them. They may not bring in something sounding "right" at first (as programmed for keyboard playing), but they can let you change timbral content inside of a single sustained tone and use timbre more expressively in your electronic music. Unfortunately, some MIDI synthesizers, don't let you use any of these fader-accessible MIDI controller values for timbre. Alas, you can lead a synth to data but you can't make it listen.

In my studio, I sometimes set up the 8 modules of my TX816 rack as four sets of stereo pairs. Overall loudness and timbre for them all are controlled by and . Each individual stereo pair's loudness and/or timbre is assigned to a different one of the four other MIDI controller types, and the 8 modules alternate as stereo left and right. With this setup, using only a single MIDI channel, I can mix, crossfade, pan, and alter the timbral content of the four different stereo pairs from the **Music Mouse** keyboard as I play. I can also punch sounds in and out suddenly using the shift-key combinations. With this kind of set-up, it's possible to integrate into the process of first-pass melodic- harmonic improvisation a range of techniques usually reserved for post-production, and this makes it easier to use electronic orchestration expressively as an integral part of the music.

Using Music Mouse with Other Software

Switcher

When using **Music Mouse** from **Switcher**, allow the program at least 90K of RAM. Although the program is much smaller than this on disk, it computes and buffers considerable internal data for its own use when it is run. When re-entering **Music Mouse** from another program within **Switcher**, it may be necessary to reselect your current synthesis mode (MIDI or internal speaker) on the "Output" menu to restore the appropriate serial drivers. Do this if you don't get output upon **Switcher**'ing back into **Music Mouse**.

MultiFinder

As of the time of this writing, **Music Mouse** runs fine under **MultiFinder**. No guarantees can be made however, because the unknown construction of other applications which may be running at the same time

Tempo

When starting up the desk accessory **Tempo** from within **Music Mouse** (putting up its menu for the first time), it is necessary to re-select your current synthesis method on the "Output" menu to restore audio or MIDI generation. After that, or if **Tempo** was

started before entering **Music Mouse**, **Tempo** will run normally and not interfere with sound or MIDI generation.

A Caveat

Music Mouse doesn't guarantee bugless or quirkless interaction with these or any other programs that may be multi-processed to run with it in the Macintosh. They make do inscrutable secret things under the Mac's hood which we outsiders can't get at to compensate for. But they will work and can be very useful.

Recording Using the "Tempo" Desk Accessory

We all want to be able record this music, and being a one-person operation here, and still primarily a composer, I haven't had time to implement recording yet. I had coded a record function that stored user input (mouse motion, keystrokes, and time), and had been sketching out a macro language ... And then, just when I had musical deadlines and no time to code it all up, someone brought to my attention a program called Tempo.

Tempo is a general purpose Macintosh desk accessory available from Affinity Microsystems (1050 Walnut St., Suite 425, Boulder, Colorado, 80302). It lets you record sequences of mouse movements and keystrokes, including **Music Mouse** performance input, and play them back as "macros" by typing key combinations on the Macintosh's keyboard, using the Option and Command (cloverleaf) key combinations. (Start with the Option key - **Music Mouse** doesn't use it at all.) So the **Tempo** macros you create appear as extensions of the basic **Music Mouse** keyboard control set, as additional instantly available keyboard commands.

Tempo macros provide a number of interesting features. For one thing, these macros function a bit like non-verbal programming language. They can be chained or nested. (That is, they can call each other - you can play one back as part of another you are recording.) You can insert "Dialog Boxes" into them which will put text up on the screen while your piece is playing back, such as the title and date of your piece, or instructions to the player about sounds to use on playback or for a musical game. Macro playback can be temporarily paused at any moment for live musical interaction by pushing the mouse button or typing a Command-comma key combination. Use the same key combination to resume macro playback where it left off. (Never use **Tempo's** Command-period key combination to end macro playback. It doesn't restore the cursor and can't be anticipated by my software, and you'll hang in a dialog box with no way to click "OK" and have to reboot the system to get out.)

You can do either realtime or non-realtime recording. The first of these is what you want for replayable musical performances. The second plays back what you did at machine speed – fast, and is good for things that you want to happen quicker than you could do them live, such as reconfiguration (hitting **t**, **f**, **g**, **d**, **s**, and **a** (seemingly) all at once.

Tempo doesn't store music as MIDI data. It records your input to the program, rather than the software's MIDI output (and remember, not all **Music Mouse** output is MIDI). There are major advantages to recording **Music Mouse**'s input stream (your interactions with the program) rather than it's output stream (MIDI data). One is that it saves a lot of disk space. At top speed, **Music Mouse** spews out over 44k of MIDI bytes per minute, but just a few bytes of control data may be all that's needed to tell the program's algorithms how to regenerate all those 44k bytes exactly. In effect, what you are recording is very high level musical information – about harmony, voicing, transposition, instrumentation – not note level data, as in MIDI files. This is like thinking about literature in terms of sentences, syntaxes, even chapters, instead of as sequences of letters of the alphabet.

Also, by recording what you do instead of musical output, you can record a passage while working with the internal sound and play it back using MIDI later.

Another advantage is that **Tempo** macros replay relative to where you start them, in terms of the current status of **Music Mouse**'s parameter settings, rather than absolutely the same each time. What does this mean? You can replay the same mouse movement pattern with different **Music Mouse** options selected, to make variations (transformations). Examples: The same mouse motion curve replayed using a different kind of harmony. Or in contrary motion. Or at a different transposition. Or transposing a series of voices changes to a different orchestrational area during a mouse sequence (i and u keys – 2 forward, 1 back, 2 forward, 1 back, etc. ... in your voice bank), so that if you play the same macro 3 times in a row, you'll get 3 different orchestrational sequences automatically. Or re-use the exact same complex up-down fader curve starting at whatever level you're current level is each time, instead of at an absolute value.

If you want absolute values and exact replication, you can record a shift-i at the beginning to establish a reference point – uniform starting values that will be the same every time you replay the macro. You'll want to do some variation of the following:

- Press delete to de-activate the mouse.
- Press the space bar to silence the music.
- Start recording from the **Tempo** menu.
- Initialize **Music Mouse** with Shift-I (if you want absolute instead of relative playback).
- Set whatever options you want on the keyboard.
- Pause the recording process (**Tempo's** Command-comma command). Select "Real Time Record" on the **Tempo** menu.

- Press delete again to re-active the mouse. Position the mouse where you want to start playing.
- Press the spacebar again to turn the sound back on.
- Do another Command-comma to restart the recording process. Play whatever you want to record.
- Press **delete** when you're done before using the **Tempo** menu to end the recording process.

You can also create non-realtime macros that produce specific configurations (set-ups, like a harmony type at a certain transposition, a specific loudness or tempo, a running pattern using a specific sound), and then jump to (or among) them as you wish, for a personal vocabulary of additional **Music Mouse** keyboard commands.

Any macro you record, realtime or not, can be used while recording another macro, so you can build pieces hierarchically, using phrases, fades, value groups, set-ups you've already recorded as components of more extended macros.

In principle, I would recommend this "structured programming" approach to composing **Music Mouse** pieces using Tempo macros. That is, make lots of little macros whenever possible, that each do very specific things, and then chain and nest them, as modules, into bigger and bigger ones, rather than recording pieces as single giant macro files. This makes editing easier and also gives you a custom library of your own personal configurations and gestural commands which can be used and reused.

The first time a **Tempo** macro is used after you've recorded it or re-entered the program, it will seem very slow because it is being retrieved from disk. After the first use, however, each macro used will be kept in RAM and be instantaneously available up to the size limit of your Mac's memory. (There is quite a lot of space for RAM-based macros, as **Music Mouse** is fairly small.)

Affinity MicroSystems tell me that a real editor for their macros is in progress, but as-is, their editing for realtime macros is not exactly what you'd call ideal for musical purposes.

I have not yet had time to connect **Music Mouse** to Tempo's looping and branching capabilities (a natural way to go for computer composition, especially when recording sequences as macros). Some of **Tempo's** activities, such as putting up its menu or accessing the disk drive, may also interfere with the computation of signal for the internal speaker.

You can, however, find other minor compensations, such as being able to set up a macro to play music at a specific time, perhaps as the world's first MIDI alarm clock?

An Idea Bank and Short Course on Composing and Playing with Music Mouse

There several reasons for using "intelligent instruments" and musical "expert systems". (An "expert system" is basically a knowledge-based tool which permits non-experts in a subject to function as though they were experts in some way.) These reasons include:

1. Not having to have keyboard, theory, notation, or other specific practiced traditional skills in order to play or compose music.
2. Being able to focus on levels above mere notes, such as phrasing, overall form, or orchestration, in order not to bog down in detail.
3. Being able to automate some aspects of the music (e.g. melodic- harmonic material) to be free to focus your concentration better on others (tempo, melodic shape, articulation timbre, post-processing).

This is a step-by-step tour of some of this software instrument's functions and how it can be played. It is best read through in order, trying the examples given under each topic as you go. Each separate option is fairly simple and straightforward, but their combination and independent manipulation yield a lot of variety. Essentially, **Music Mouse** can be thought of as a modular system (like the early analog synthesizers), where each dimension of choice represents a module and is available in combination with every state of every other "module", resulting in a vast variety of possible states.

This tutorial section is meant to familiarize you with **Music Mouse**'s operation in a hands-on manner, but it is not a comprehensive explanation of them. For that, and for certain other exercises to try, see the body of the manual.

Remember, the Shift and Command keys are not used unless specifically indicated, even when characters normally thought of as "upper case" (such as **>** and **+**) are specified. Character names refer to physical keys, not the letters they represent, and these were chosen because are easier to remember, not to make things more complex.

Before beginning, type **help** to reset all values to their initial states, so we know where we're starting from.

Mouse Exercises and other Things to Try

Moving The Mouse

Move the mouse slowly, in small gentle motions, to get a feel for how it moves the sound. Though it's easy to be intoxicated at first by the ease of playing zillions of notes, relative to the difficulty of doing so on traditional instruments, this is still a musical instrument in all the traditional senses, and its music benefits from your acquisition of fine control through practice, and from your sensitivity in listening to your own playing.

Just move around however you feel like it. Listen. Some places will sound like points of arrival, while you'll find yourself wanting to keep moving on when you pass through other places.

Move toward the upper right. Both lines sound higher in pitch. Move toward the lower right. One line gets higher while the other descends.

The mouse's axes of motion are entirely independent of each other, so you can play two completely independent musical lines, vertical and horizontal. Try moving just up and down and then just side to side. Play a moving melody against a constant drone by moving the mouse on either its vertical or horizontal axis while holding the mouse still on the other axis. This is not as hard as it sounds, since the mouse's motion is quantized by the software.

Interesting harmony-melody effects can be created by repeating patterns of mouse motion on one axis and then the other. Try moving one note up then one note to the right, up, right, up right... (in a sort of a staircase pattern) or conversely, repeatedly down and then to the left. Or move up, down, down, up, then right, left, left, right. Moving melodically on one axis at a time produces harmonic suspensions: a note in one voice sustains through a pitch transition in the other voice and then resolves later. Make up some other simple movement patterns. (Incidentally, if you were doing this on paper, it would be called "composing".)

Try the same motion patterns around a different center pitch (the same pattern starting on a different location relative to the keyboard display). This will give you different chordal harmony within the tonal key. You'll find that the same pattern may have different emotional qualities when placed at different places in the scale (on different "scale degrees") - sadder or more positive, tense and wanting in resolution or centered and arrived in feeling. Try to get a feel for and to remember where these chord feelings lie relative to the cyclic note patterns shown on **Music Mouse's** keyboard display border.

Try just repeating a simple movement pattern over and over until you feel you want to break out of it, then move freely for a while, by ear and by feel, without any attempt at

structure. Then fall into the same pattern you started with again, at whatever different location you've arrived at. Or try some different pattern of movement which seems related (such as the previous movement shape backwards or upside down).

Make up some patterns which end up one or two keys from where they started (like left- right-left-left, up-down-up-up...).

Musical jargon for the kinds of things you're playing with in these exercises might include musical line, motivic pattern, melodic contour, the contrapuntal interaction, harmonic progression, phrase structure, and compositional shape.

For **Music Mouse**, line (melody) is primary, and musical harmony grows out of it. This is different from other approaches to music, in which a chord series may be primary, and lines can then be threaded through the chords. As you weave and evolve your lines, **Music Mouse** will do its best to make sure that the notes in the 4 voices work together harmonically, so you can concentrate on melody, the shape and timing of your lines of motion, and on other aspects of music which we'll get to below.

The Mouse Button: Suppressing and Repeating Notes

The playing of new notes is temporarily suspended while you hold the mouse button down but you can see your position in pitch-space displayed on the screen. This lets you make non-step-wise melodic and harmonic movements. Try moving from one specific location to another with the mouse button held down and then picking exactly the right instant and place to release the button and sound the new notes.

If you're not familiar with music keyboards or chordal harmony, it will help you in moving silently from place to place if you try to remember the feelings of the sounds that go with different positions on the pitch display, and to develop a sense of which ones sound good after each other. Your ear will pick these up and remember them remarkably fast. You already know them. They're part of a musical vocabulary you've been hearing all your life. What's new here, in **Music Mouse**, is that you're in control, and that in order to move silently between them, you have to be able to identify them visually. Notice where you are on the screen - which notes on the border display are pointed to by the polyphonic cursor. You only need to keep track of the left most and lowest cursor lines on the display. The others are taken care of by the program. Notice where the notes intersect on the hand-woven-looking grid that covers the screen. The patterns in it repeat every octave in each direction. Try to become familiar with the chord sounds at the various locations in the repeating pattern of the grid, so you can move between them, discontinuously, using the mouse button, and know where you'll land in sound.

Now try playing notes with the mouse button, by pressing and releasing it. Try playing some rhythm while holding the mouse still, then move it and repeat the rhythm, then move the mouse back and play the rhythm again. You can repeat notes or chords more easily by hitting the **r** key (or the key for whatever harmony type you're in), but

there will be times when you're in the middle of a fade or other keyboard action and will want to be practiced at this mouse method of repeating because only one key on the keyboard can be active at a time.

Hold down the current mode key (in this case **r**) to repeat the last chord you played. All of the pitch-selecting keys (**q w e r t y, f d, z x c**) cause notes to be played. If you don't want this to happen, hold down the **command** key while you press them, and the transition to any new notes will be silent.

By using the mouse button and the **cmd** key to make silent movements and transition, you can play music you already know, such as songs, by ear, as melody and accompanying chords. It's a slow and cumbersome process in **Music Mouse** and not at all what this program was designed for, but it can be a very beneficial and educational process anyway. Press help to restore everything, then, using the mouse button to move silently between the notes you want to hear, start with a simple melody on the mouse's up/down axis. Then try putting some chords against it on the y-axis. This process can be frustrating, so if you don't like it, just go back to moving and playing freely, which is what this program is really for.

Value Oscillations and Grouping

The Macintosh keyboard's "repeat key" function, used throughout **Music Mouse**, makes possible some strange and interesting effects.

Hold the **f** key down and you'll get a strumming-like tremolo. Make sure you're using a sound with a fairly fast attack because notes with long slow attacks may take so long to become audible that you won't be able to hear them when they're played too fast. Try this with **d** key. Press the **g** key and then move the mouse in one direction or the other but not both. Hold down the **f** or **d** again and listen for the difference. The **g** grouping function switches between a fuller and a more fragmented iteration. When "group" is on, all four voices will play their notes whenever any of them have a new pitch. When it's off, only the voices which have new pitches will play their notes.

Articulation

If you're using a MIDI-controlled external synthesizer, you'll need to use a sound with a fairly fast attack, such as a piano or plucked sound, to hear staccato notes, because long attacks may not grow loud enough fast enough to be audible.

While playing the mouse, try to put variety and expression into it by going back and forth between staccato (short discontinuous notes) and legato (long sustained notes that don't let go until the next notes sound) with the **/** key.

Try making a legato phrase and hold still for a moment at its end. Then answer it by a staccato phrase of the same length which seems to echo or respond to it. Now try

going back and forth at even intervals of time, such as every 4 or 8 beats, instead of every phrase, and running continuously, instead of pausing between phrases.

Some Keyboard Chops

Now hold the mouse still and repeat the last note or chord in a rhythmic pattern using the **r** key. Toggle the **/** articulation key then repeat the same rhythm. Go back and forth. Now, using both hands on the keyboard, try toggling the legato/staccato status whenever it feels right, not just between repetitions of the rhythmic pattern.

Now try playing the same rhythmic pattern by going back and forth between the harmony selection keys **r** and **t**. Rhythm can be built out of melody, harmony, or other musical parameters just as easily as it can be built out of loudness.

Good music doesn't require a lot of busy activity or constant change. It needs changes that feel right at just the right moments. Simplicity is fine (actually it's often the most musically powerful), and timing is essential. A large part of musical art consists of careful and sensitive control over how long to go on with the same thing before changing it. Good composing often involves getting the most music out of very little material rather than having everything going at once all the time.

Press the **a** key for automated pattern generation, and try the different articulations again. (See the section on Added Patterning and the **a** key in the main body of the manual for some things to try with automated generation and the various rhythmic Treatments of chords selectable on the **F1** through **F4** function keys.)

Tempo

Re-initialize the program. The **-** **+** and **[** **]** keys control the tempo (speed, or rate) at which the program sounds notes. (Both fader pairs work the same.)

Hit the **-** key a few times. Now the music moves slowly, evenly, and steadily, regardless of how you move the mouse. You can leap several notes across the screen before the computer plays the next sound.

Hold the **+** key down for a second or so. The Macintosh's repeat key function will move you all the way to the fastest tempo. (If you had just hit it once briefly, as in normal typing, you would have sped up only a little.) Now when you move the mouse you hear every note the mouse moves through, and are totally free in your timing, rhythm, and phrasing. You can still use the mouse button to suppress note playing if you want to jump around on the screen silently. There is no steady even meter now, though, unless you make it yourself by how you play.

You can make a fairly rapid smooth accelerando (speeding up) or rallentando (slowing down) by holding down either the **+** or **-** key while you play. You can make a much more expressive and musically powerful version of either tempo change, though, if you

use these keys in series of small light taps, creating your own curves of speed change, and listening every step of the way.

Try making different curves of acceleration, starting slowly and hitting the **+** one hit at a time, whenever it feels like exactly the right moment to gear up a little. With the patterns turned on (the **a** key), play a long acceleration which starts at a fairly slow tempo, gets a bit faster, backs off, gets even faster, backs off again, and goes on and on building suspense by moving forward and dropping back till it finally goes all out.

Now for something different, move the mouse repeatedly in some slow cyclic pattern (such as a circle) at a fairly constant rate. Now start changing the tempo to which you're rhythm is quantized by using the **-** and **+** keys. Listen to how the two time-cycles (mouse pattern cycle and timing cycle) interact with each other to change the musical patterns you hear. This is a kind of musical "interference effect". Keep circling slowly and evenly, and changing the tempo until a certain sense of pressure has built up, and then break out of the circle on a straight line, move freely a while, and end on a point that gives you a feeling of arrival and resolution.

The **** (backslash) key switches you to an alternative tempo which you can adjust with the **[** and **]** keys. With the patterns turned on (**a**), or just using the mouse, set 2 different tempos and then flip back and forth between the two with **** while you play.

Play with tempo change curves and tempo switching again with **a** turned on.

Loudness

The **<** and **>** keys fade the sounds up or down in loudness. Like **-** and **+** discussed above, the shift key is not needed.

Pressing either of these keys once, in a normal typing fashion, will change the sound's loudness only very slightly. But holding either of these keys down will cause the value controlled by that key to keep on moving, fading the sound toward its minimal or maximal level until it gets there.

In general, it's a good idea to keep the loudness controlled by these keys a few levels down from maximum while playing, so you have room to grow when you find yourself wanting to make the music build.

Use these keys to put expression into whatever else you do from here onward. Keep them in mind while going through the rest of this tutorial. Fade the sound down at the end of a phrase and bring it up again on a new chord. Fade up at the beginning of your improvisation and fade out at the end. Try fading up and down on a sustained tone. Use these keys to keep long notes from being all too constant, to put shape into them.

If you're using MIDI, select a sound with a fast sharp attack, such as a piano or plucked instrument. Turn on the automated patterns (with the **a** key) and set the

tempo very fast (hold down +). Press **shift-<** to set the loudness all the way down. Now fade the texture in by holding down or intermittently pressing the > fader key. Go back and forth between 2 patterns in some kind of steady rhythm, using the number keys. Build up to a dramatic break point, stop everything dead in its tracks by hitting the **a** key, and pause. Then - when it feels like just the right moment - restart the texture with the **a** key, then fade down slowly, returning to silence. Now make up a different compositional structure all your own, and fade it in and out. (Listen for these types of structure in the music you hear.)

Using Timbre

If you have MIDI, the **u** and **i** keys move you cyclically back and forth through your MIDI preset bank. Try them. If the notes hang indefinitely so that they get chopped off in transition to the next sound, use **/** to release them first. (Press it twice rapidly to end up back in Legato mode.) Or use can use **shift-/** to go into "half-legato" mode, in which the notes will sustain only for the duration of one **Music Mouse** beat.

In Internal Speaker mode, the **u**, **i**, and **o** keys select different audio waveforms (different qualities of sound). These keys give you (in order) triangle, square, and sawtooth waves. Place the mouse on a chord you like. Put three fingers on the **u**, **i**, and **o** keys, and play rhythms on them during the sustained tone. Move the mouse when you feel like it with your other hand. Now, with your thumb, try working the spacebar into the rhythm of your fingers.

If you have MIDI, play a phrase with the mouse using any sound you like. Move to another MIDI sound with the **u** or **i** key, and play an answering phrase using the new timbre. Then return to the original sound to play a concluding phrase.

If you have more than 1 channel's worth of MIDI synthesizers, try setting the horizontal and vertical mouse axes to different MIDI channels. (Place the arrow cursor on a channel number on the display, press and hold down the mouse button, and drag the displayed value up or down by moving the mouse left or right.) This will let you play different sounds with your horizontal and vertical movements. Try playing alternate phrases in the 2 timbres on the 2 melodic axes.

With any velocity-controllable MIDI synthesizer, hold down the **v** and **b** keys alternately while playing the mouse or running the patterns, and listen to the way the timbre and loudness change. Try using these keys to build toward a climax as you play. MIDI velocity is more musically powerful than loudness (**<** and **>**) because it is generally used to change timbre in direct proportion to loudness, which is what happens in real acoustic instruments. (The availability of this control dimension, and the other MIDI controls which **Music Mouse** provides, will depend not only on your synthesizer but also on the sound definitions you have loaded into it.)

Try the various MIDI controllers to see what effects each has on your synthesizer's sounds. Try these four fader-pairs: **h j**, **n m**, **k l**, **;** **'** within each of your long sustained MIDI sounds to find out what expression (such as vibrato) you can put into the sustained timbre.

If your MIDI synth permits, try defining a sound (or a multi-channel sound group - such as for an FB01 or TX816) which lets you use each of **Music Mouse's** MIDI controllers to influence timbre in a different way (the EG Bias on any modulating operator in an FM synthesizer, the LFO depth or rate or filter controls of certain sampling instruments, etc.). In general, these controllers will probably do more for you, expressively, on any synthesizer which uses algorithms (such as Yamaha's Chowning FM or the methods used in the Ensoniq ESQ1) to compute sound than they will on synthesizers which make sounds by replaying recorded audio signals from stored data tables ("sampling machines"). Algorithmic synthesis usually provides a relatively small number of fairly powerful timbral controls, whereas sampling instruments tend to focus on accurate reproduction instead of interactive timbral freedom - the ability to let you change sound quality simply and easily while you play. The difference between algorithmic synthesis and sampling is similar to the difference between painting and photography. The latter may be more accurate and realistic, but it provides less freedom of expression and control in some very significant ways.

Harmony Handlers

By pressing keys in the **q w e r t y** group, you can change to other scales and make different kinds of chord changes. As you've found out above, you can actually play quite a bit of music from the Macintosh's keyboard with hardly a mouse move at all. Try each of the other harmonic modes for a while, to get the feel of it.

The several types of harmony available in this key group are arranged in decreasing resolution (decreasing order in terms of number of notes per octave), left to right.

Even if you have MIDI, you owe it to yourself to try the non-quantized pitch mode (selected with the **tab** key and available only with Macintosh sound, not MIDI). Hold down **+** to speed up the tempo all the way and smooth out the timing quantization effects. The standard polyphonic cursor disappears because it no longer meaningfully maps the pitch space in which you are moving. Move the mouse around. You can glide around in pitch space almost as though standard pitch scales had never been invented.

Now slow down your tempo (or re-initialize with **he lp** or on the "Exit" menu) and continue to move the mouse. Now, no matter how smoothly you move, the continuous pitch space will be broken up into microtonal steps by the rhythm which intersects your movement.

The **q** mode gives you all the notes in the Western European equal tempered scale, for fully chromatic movement. You'll see your music move completely step-wise on the display.

The **w** puts you into the Octatonic scale, a modern mode whose best known users have been Stravinsky, Bartok, and Messiaen.

The **e** is a sort of modified (non-microtonal) Middle Eastern / Eastern European mode (taken from an old Yiddish song book). Try it with contrary motion (**d**) and in voice-pair (2 by 2) format (**f**). It's also useful for inserting chromatic or otherwise non-diatonic-scale transitional notes between pitches while you're playing in **r** (regular diatonic harmony), when you use e for just one or two transitional notes and then go back to **r**.

The **r** puts us back in regular diatonic-tonal music, where the program starts you out. This is the lowest common denominator generic scale of our musical culture, from popular through classical.

The **t** gives you the pentatonic pitch collection, which is widely used in many non-European traditional musics. Variants of it form the basis of styles ranging from Chinese Classical Music to American Mississippi Delta Blues. It is an equivalent set to all the black keys on the piano, but in **Music Mouse** it has been transposed so that it moves back and forth more smoothly with the other harmonic modes.

The **y** is quartal harmony (built on fourths and fourth chords). Because all the intervallic movement is by perfect fourths, this mode lacks the intervallic variety which the other modes provide, and it is therefore best used with a liberal sprinkling of other pitch controlling options. Try using the **z** or **x** (transposition) keys whenever it feels like it's time for a change, and moving frequently in and out of the other modes as well.

Now, go back to where we started (**r**). Play back and forth in some rhythm you like between two adjacent mouse locations. Do this at your own pace until you feel a real buildup of musical tension that wants to move, to break out. Now, instead of moving the mouse further, hit one of the other harmonic mode keys. (Remember to hold the **cmd** key down if you don't want to play the new notes at the same time as changing harmonic modes. You can then use the mouse button to position yourself just where you want to be in the new harmonic mode or transposition before any notes are actually played.)

Leave the mouse still. Press and occasionally hold down, as you feel like it, the various harmony keys, creating some kind of phrasing or rhythm. Start simply by just alternating 2 of the harmony selector keys then varying their rhythmic relationship with each other. Then work in a 3rd harmony key. Move the mouse to a different location and try this again. Try something similar with **g** on and then again with it turned off, and then mix in the **f** and **d** options.

As you learn to read the notes from the display and get a feeling for how they sound together, or if you know music theory already, you can make good use of the mouse button by changing both the mode and the mouse position between audible notes while holding it down.

Look at where your the polyphonic cursor lines intersect against the woven-looking gray grid on the screen. Figure out a few chord changes that you like and remember them for future use by where they are on the screen grid. You can move between any two points silently with the mouse button down, but it helps to know in advance where you're going.

Notice that even in **q** mode, without a real system of harmony such as the other modes have, the strength of just the melodic lines themselves can be enough to make what you do musically coherent and interesting. Try moving slowly down one note, then left one, then down, then left (etc.) or in other alternate-axis stepwise patterns (when you move in only direction at a time) to get chromatic suspensions. Press **f** and try this again, and try both statuses of **d** too.

With **+** all the way up (at the fastest tempo), try putting the cursor at the extreme lower left of the screen and moving it very slowly and gradually along some rambling diagonal path going vaguely toward the upper right. You'll probably find yourself wanting to go faster and faster as you travel, so do it. Let your ears guide you step by step. When you get to the upper right, or someplace on the way that feels right, stop and fade out with **<**, slowly, one keypress at a time. Try this compositional exercise in each mode. You may want to repeat the last note as you fade down if you're not using a sustained tone, and can do this by pressing and releasing the mouse button.

Re-explore any of the motion pattern exercises described in the first section of this Tutorial in each of the harmonic modes. Build them as long musical climaxes with real resolutions. Try them with different harmony types, and especially try them with different sounds (via **u** and **i**, if you have MIDI).

Transposition

Press **he!p** to be sure you're starting at zero transposition and in diatonic harmony. Remember your starting position on the screen by its lower left intersection, and play a short phrase. Hold down the **cmd** key and press **x** three times. Holding down the mouse button, move the cursor back to where you started and replay the same phrase as before. It will fall in a different place in the tonal key and you will find its character and harmonies changed. Replay the phrase starting two cursor moves higher and to the right on the screen. It will now sound the same as the original in terms of chord qualities, but will have been moved to a different key (it is the same relative to a different "tonic" or base pitch from before). Press **c** and you'll be transposed right back to where you started.

If you're using MIDI, select a sound with a fast attack. Then hold down **x** for a while and then **z**. Make large sweeping contours, big shapes of running lines, changing direction back and forth.

Now press **f** to get 2 voices on each axis, place the cursor group roughly in the middle of the screen. (For this exercise, back this rate off from its extreme fastest speed by hitting the **-** a few times.) Starting in the middle of the screen, move few steps in one direction and then a few in the other with the **z** and **x** keys, hitting single strokes, or holding them down. Make the moves go out further and further from the center, until you're covering the whole screen, corner to corner in giant running scales. (If you don't like the rate at which they're moving, find yourself a more comfortable speed by adjusting the key repeat rate on the Macintosh's Control Panel.)

The transposition keys are good for movement in equal steps of any size up to an octave. Press **shift-x**, then hold down **z** or **x**. Now you're moving up and down what's known as the Whole Tone Scale. If you press **shift-x** again, you'll be moving by minor thirds (in other words, moving up and down in diminished 7th chords), and after another **shift-x**, you'll be doing augmented triads by moving in major thirds. One more will let you move by fourths, which is a very common and natural-sounding interval for chord changes and harmonic modulations.

Automated Melodic Patterning

Re-initialize everything again. Play a phrase with the mouse and then hold on some note. Then turn **a** on for just a note or two and then off again and pause. Turn **a** on and off again, letting it make phrases for which you govern the timing and length.

Turning **a** on and off, play with phrasing, making melodies that run then hold back or which stop awhile on notes of suspense or of resolution. Move the mouse a bit between pattern phrases.

Then let the patterning run continuously and try changing back and forth between two or three different patterns by hitting different number keys. Try to make the changes just at the moment when repetition begins to become noticeable.

While a pattern is running full speed, press the various pitch-governing keys (**q w e r t y, z x c, s f d g, 0-9**). Go back and forth between two settings on one of these keys. Try fading one of these complex textures slowly down, with one hit at a time on the **<** key, until it virtually disappears. Change to the other setting then fade back up with **>**.

If you have MIDI, switch back and forth between sounds with **u** and **i**. Different sounds will bring out different notes in the running patterns, or different qualities in the textures if you're running them fast. Some sound types will want to be played more slowly than others.

Now add the Rhythmic Treatment keys (**command** **1-4** or **F1-F4**) to your working vocabulary for manipulating the running patterns. These give you different rhythmic Treatments for chords. (Make sure you're not running at too fast a tempo to hear this.) Move back and forth among the treatments and use any other controls you want. (Don't forget during all this that you can still move the mouse too.)

To begin, mute all the voices except one (using **shift-1** through **shift-4**, or their equivalents, **0-3** on the keypad if you have an extended keyboard) and then build up the music by bringing in (unmuting) one voice at a time. Play with the texture, the counterpoint, punching the voices in and out with the Muting keys, to reveal the relationships between them.

Leave things running in some state that requires relatively little input from you moment to moment (such as Line Treatment of a pattern with **a** and **Cmd-3**), so that you can concentrate for a while on the various orchestrational and expressive controls (**-** **+**, **/**, **<** **>**) and the MIDI timbral faders (**v** **b**, **<** **>**, **h** **j**, **k** **l**, **n** **m**, **;** **'**). These will have different effects depending on your synthesis method and the individual sounds you use. Not only can you put very musical dramatic shapes into your music with timbre and articulations, but the patterns can actually seem to change their content depending on their orchestration as different notes gain and lose distinctness.

Symmetries

Select voice-pair format with **f**

Turn the patterning off, if it's still on, by pressing **a**. (two lines running in each direction on the screen).

Now press **d** and move the mouse. You've got a pitch kaleidoscope with symmetry in each of the directions that the mouse moves. Move the mouse to some location that feels like a musical resting place. Now try moving in some left-right-left pattern and then repeating the same pattern on the other axis, as down-up-down. (This is called "imitation" in music-speak, one melodic voice echoing the movement of another slightly later.) Move the voices some distance further apart on just one of the two mouse axes and try this again.

Now press **f** again to return to melody-harmony format and move the mouse toward the left so that the single voice is on the left, moving in contrary motion to a pair of voices at the right. This gives us what Baroque-period European musicians might have called a "Trio Sonata" voicing. We have an independently moving melodic line (moving up and down), accompanied by two inner voices moving contrary to a bass line. "Trio Sonata voicing" is actually still fairly common even now, and can be recognized in the classic rock and roll format of bass, rhythm, and lead guitar. (Musical styles may change, but music's organizational principles can be fairly enduring.)

Press **d** again to go back to parallel motion then start the patterns with **a**. Now press **s**. The **s** key gives you symmetry on the pattern level which is exactly the same as that which **d** gives you for mouse movement. Like the **0-9** keys, **s** will not affect what you hear while **a** patterning is turned off. But if you set **s** while **a** is off, its value will be stored for use the next time **a** is turned on.

The **d** and **s** levels of symmetry are completely independent of each other. You can use neither, both, one, or the other at any time.

As is the case for all the pitches produced by **Music Mouse**, contrary moving lines on both the mouse and in the added patterns are adapted by the software to work in each harmonic mode, voicing, and transposition. For the **d** and **s** symmetries, the software produces forms of "tonal and modal inversion". These non-linear inversions differ from "strict inversion", in which melodic lines are inverted by their exact semitone content, which rarely works well in tonal or modal music.

Some Two Part Counterpoint

Try this: Select Re-Init on the Exit menu to get everything back to normal.

Press **shift-1** and **shift-3** to mute two of the voices.

Press **cmd-4** (**F4**) and then **a**, and select pattern number **4**.

Play with **shift-2** and **shift-4** to bring these 2 voices in and out against each other, and go back and forth between the Rhythmic Treatments on **F3** and **F4**. Press **shift-3** to bring in another voice.

After playing with all of this for a while, when you feel like it, add the last with **shift-4** and start playing it with the mouse.

Combining Music Mouse Controls into Compositions

Re-initialize everything,. Select the **q w e r t y** mode of your choice. Now press **d** and then **f**. Move the voices on each mouse axis toward each other until they form a unison. (The 2 pitch cursors on each axis will disappear.) Starting on just one mouse axis at first, then using the other axis too, move a little off the unison and then back to it as a musical resting point. Move the voices outward again and return, and repeat this, gradually increasing the distance from the unison and the complexity of your path.

Return to unison position and turn **a** on and off, for a few notes at a time, letting it go for longer and longer runs until it feels like time to let it just run continuously. Then add another dimension by starting to flip **s** on and off and moving back and forth between the patterns on the **0-9** keys. Then, with the mouse, start to move the lines outward from unison between phrases.

Try something like the above, but starting in a different harmonic mode, perhaps **t** or **w** this time. Start simply with all the voices close together as above, and build up intensity gradually, in distance from unison, in the complexity of your path, and speed of mouse movement, with lots of internal build-ups and build-downs along the way. Introduce any Music Mouse option that feels right whenever you want, but one at a time, sparingly, to make the overall build-up last and to give each individual change a chance to register its full impact in the music. When everything is going at once, as strongly and fully as you want, and the voices are far apart, then gradually, but overall more quickly, build the piece back down again to where you started, for an "A-B-A" (or "arch form") composition.

Concentrate on time structure. Make rhythms and phrases in your timing as you change the various options. Rhythm can be expressed in just about any dimension of music. Make up a short sequence of changes to any ongoing texture, using the mouse and any of the keyboard options in whatever order you want. Try playing that same sequence of changes with different rhythms and then again on different kinds of musical textures.

Invent a compositional structure of your own and try a few variations on it. It can be any kind of overall shape which you can make hearable by performing it within the Music Mouse parameter space. Start simply with a short clear shape, aiming for maybe 1 minute in length. Your shape can move from one point to another, in pitch, loudness, timbre, speed, density, complexity - anything you can think of -, and stay there and end. Or it can move back to where it started. Or repeat over and over. It can be an alternation of 2 or 3 things. You can have more than one kind of transition going on at once, perhaps interlaced, in different musical dimensions, one thing building up while another is receding. Do whatever you want, but it's generally best not to plan in advance to do too much at once. Work on making real endings, too.

Take your time while you're playing through ("realizing") your composition and really listen to the music as it happens. Be adaptable and follow where your music wants to lead you instead of insisting on leading it. It will make new suggestions to you as you go along, some much better than anything you could have thought of in advance. Feel free to follow them. Musical compositions often seem to take on lives of their own once their composers begin to hatch them, and it can get in their way if you feel obligated to stick to plans. It isn't that the piece is taking over. It's not a living being. But something in the creative unconscious seems to click into place on a musical plan and work on the musical design, getting ahead of the level of which we're consciously aware. A more fully elaborated composition is getting clearer inside you. Let it happen, even if it's not what you thought you intended.

Try not to design a structure so complex that it requires a lot of attention and effort just to follow it and keep it together while you play through it. You want to be able to focus your energy and attention on making each moment wonderful, spontaneously alive, and too much complexity will get in your way. Also, you don't want to limit your creative

freedom while you're playing by overly restricting yourself with complicated structure. Don't try to work with everything at once or to put some of everything you like into any single piece. (Most of the composition students I've had over the years seem to start out trying to do this.) Instead, try making several different pieces from your several different ideas, each piece simple and clearly an individual and different from the rest, focussed. Get every bit of musical impact and power that you can out of each thing that you do. Good composing often achieves its effects by concentrating and getting more music out of less material. (An archetype is Beethoven's Fifth Symphony.)

When you've found a structure you like, change to different sounds and try playing through it again. You'll be amazed how strong the effect of a change of orchestration can be on a musical concept. Also try expressing the same abstract structure through a different set of music mouse parameters.

MIDI Manipulations

Music Mouse is a complete self-contained MIDI controller program, and lets the computer be used as a stand-alone interface sufficient to play "rack mount" MIDI synthesizers which lack keyboard or other hardware controls, and are generally available more cheaply than keyboard synthesizers.

If you do have a keyboard synthesizer, your keyboard will remain "live" while Music Mouse is running, so that your synthesizer can be played simultaneously from your Macintosh and from its own keyboard. Two people can play together on the same instrument via these two control paths. Also, a single person can play a solo part on the conventional MIDI keyboard with one hand while using Music Mouse to create an accompaniment with the other hand.

As a general-purpose MIDI control program, Music Mouse implies nothing about how its MIDI output will be used. For example, MIDI can be converted to analog control voltages through a variety of devices on the market, and can be used to control an analog video synthesizers or other analog equipment. One player has been working out musical games for two players on a single computer running Music Mouse. It's up to you to find your own alternative applications. There are doubtless plenty more out there and the potential is not bounded.

Why Music Mice Have Big Ears

One more thing to try: When you hear music, even just as background for film or TV, listen for Music Mouse-like shapes, transitions, vocabulary: for stepwise movement or leaps, contrary or parallel motion, repeating melodic patterns moving through adjacent base-pitches, for general types of harmony and changes to other types, for whether melodic lines move together or independently of each other, for shapes and lengths of phrases, for structure and overall form, for repetition and variation, for changes of tempo, loudness, and orchestration.

Now that it's easy to play all those notes, there's another vitally important skill to acquire, one which no software can provide to you no matter how sophisticated its logic. This is the development of a sensitive and aware ear, practiced in picking up on what's going on in music and in knowing what it likes. The options and controls which this program supplies are more than just a way of "intuitively" controlling sounds. They also constitute a basic conceptual vocabulary of musical structures, materials, dimensions, changes, and paths. They're a subset of a larger musical language. Recognize, speak, hear, and use them, listening carefully. Welcome to the process of making music.

– Laurie Spiegel

Music Mouse Keyboard Controls

A Quick Reference List

General Controls

| Key | Type | Parameter |
|---------------|----------|--|
| delete | switch | Disconnect mouse and from the music. |
| cmd-a | switch | Pattern cursor on/off. |
| help | selector | Re-initialize all musical parameters to their start-up values. (Alternative for small keyboards: Use menu.) |

Pitch Content

Harmony Type

| Key | Type | Parameter |
|----------------------------|---------------------|--|
| tab | selector | Non-quantized frequency space. (Macintosh internal sound only.) |
| q | selector | Equal tempered scale, Chromatic harmony. |
| w | selector | Octatonic scale, Stravinskian (etc.) harmony. |
| e | selector | Middle Eastern scale. |
| r | selector | Diatonic scale, Tonal harmony. |
| t | selector | Pentatonic scale, Modal harmony. |
| y | selector | Cycle of fourths, Quartal harmony. |
| Control-q w e r t y | (quiet transitions) | Same as qwerty keys (above) but no notes are played. |

Transposition

| Key | Type | Parameter |
|----------------------|---------------------|--|
| z | cycler | Transpose down by semitones and play new notes. |
| x | cycler | Transpose up by semitone and play new notes. |
| c | specifier | Return to zero transposition (C major) and play new notes. |
| Control-z x c | (quiet transitions) | Same as zxc keys but no notes are played. |
| shift-z | fader | Reduce interval of transposition by 1. |
| shift-x | fader | Increase interval of transposition by 1. |
| shift-c | specifier | Reset interval of transposition to 1 semitone. |

Added Patterns

| Key | Type | Parameter | |
|-----------------------|-----------|---|------------------------------------|
| a | switch | Add melodic patterning. | |
| 0 ... 9 | selectors | Select melodic pattern to be heard if "add patterns" is on. | |
| Patterns | | | |
| 1 | selector | 0 4 5 0 4 3 4 5 0 4 | (10-note cycle) |
| 2 | selector | 0 2 4 7 4 2 | (6-note triadic arpeggio) |
| 3 | selector | 0 1 2 3 4 3 2 1 | (8-note cycling scale) |
| 4 | selector | 0 1 2 3 4 5 6 7 6 5 4 3 2 1 | (14-note cycling scale) |
| 5 | selector | 0 4 7 11 7 4 7 4 | (8-note extended triadic arpeggio) |
| 6 | selector | 0 1 0 1 2 1 2 3 2 3 4 3 2 3 2 1 | (16-note stepwise cycle) |
| 7 | selector | 0 2 3 4 5 6 5 4 3 2 | (10-note cycle) |
| 8 | selector | 0 7 1 6 2 5 3 4 4 5 2 6 1 7 | (16-note cycle) |
| 9 | selector | 0 1 4 1 0 4 0 4 | (8-note cycle) |
| 0 | selector | 0 7 0 0 2 1 2 4 3 4 2 1 2 0 0 0 | (16-note cycle) |

Voicing

| Key | Type | Parameter |
|-----------------------------------|---------------------|---|
| Direction | | |
| s | switch | Symmetry: Parallel / Contrary motion switch for the patterns which adds to the four voices. |
| d | switch | Direction: Parallel / Contrary motion switch for the mouse-controlled pitch lines. Plays new notes when pressed. |
| Axis | | |
| f | switch | Format: Toggles between two ways of voicing: Chord-melody (solo voice on mouse y- axis and 3-note chord on x-axis), or voice-pairs(two voices on each axis). |
| Response | | |
| g | switch | Group: When on, all four voices always sound together. When off, each of the four voices sounds only it been moved to a different pitch from the last one it played. |
| Control- d f | (quiet transitions) | Same as d and f keys but no notes are played. |

| Loudness | | |
|--------------|--------|----------------------------|
| < | fader | Quieter |
| > | fader | Louder |
| Articulation | | |
| / | switch | Staccato / Legato. |
| shift-/ | switch | Half Legato / Full Legato. |

Muting

| Key | Alt. Key | Type | Parameter |
|----------|--------------|--------|--|
| shift-1 | keypad-0 | switch | Horizontal voice muting. |
| shift-2 | keypad-1 | switch | Variable-axis voice muting. |
| shift-3 | keypad-2 | switch | Vertical second voice muting. |
| shift-4 | keypad-3 | switch | Vertical lowest voice muting. |
| Shift-~ | keypad-enter | switch | All voices on. |
| ~ | | switch | Muting Reverse. (All voices on turn off and conversely.) |
| spacebar | Keypad- . | switch | Sound / silence. |

Temporal Placement

Tempo

| Key | Type | Parameter |
|---------|--------|---|
| - | faders | Basic tempo lower. |
| + | faders | Basic tempo faster. |
| [| faders | Alternate tempo slower. |
|] | faders | Alternate tempo faster. |
| \ | switch | Use Basic / Alternate tempo as current tempo. |
| shift-\ | switch | Set current tempo to default value |

Rhythmic Treatments

| Key | Alt. Key | Type | Parameter |
|-------|----------|----------|-------------------------------|
| cmd-1 | F1 | selector | Horizontal voice muting. |
| cmd-2 | F2 | selector | Variable-axis voice muting. |
| cmd-3 | F3 | selector | Vertical second voice muting. |
| cmd-4 | F4 | selector | Vertical lowest voice muting. |

Sound Selection and Characteristics

Macintosh Internal Sound

| Key | Type | Parameter |
|----------|----------|------------------------|
| u | selector | Use triangle waveform. |
| i | selector | Use squarewave. |
| o | selector | Use sawtooth wave. |

MIDI Controllers

| Key | Type | Parameter |
|---|-----------|--|
| u | cycler | Step back to previous MIDI "voice" (sound). |
| i | cycler | Step ahead to next MIDI voice. |
| n | fader | Lower the MIDI "modwheel" value. |
| m | fader | Modwheel value higher. |
| o | fader | Portamento shorter. |
| p | fader | Portamento longer. |
| h | fader | Lower the MIDI "breath controller" value. |
| j | fader | Breath controller value higher. |
| k | fader | Lower the MIDI "foot controller" value. |
| l | fader | Foot controller value higher. |
| ; | fader | Lower the MIDI "aftertouch" value. |
| ' | fader | Aftertouch value higher. |
| v | fader | Lower the current "velocity" value. Default = 100. |
| b | fader | Raise the "velocity" value. |
| For any of above: Set any of the above parameters to its extreme value: | | |
| shift- | specifier | Left key of each pair sets control value to 0. |
| shift- | specifier | Right key sets value to 99 (on a scale of 0 to 127). |

Before You Go Off and Lose Yourself in Playing this Program,

REMEMBER:

ENJOY THE PROGRAM!!!!

Treatment of Any Chord
 Chord Arpeg. Line Improv.
 F1 F2 F3 F4

Music Mouse Macintosh Keyboard Controls

Music Mouse™
 By & © 1986 - 97
 Laurie Spiegel

Alt's for small Mac keyboards:

Treatments

Muting Controls 1 2 3 4 5 6 7 8 9 0

Generic Pattern Selectors

Basic Tempo

Slower Faster

Disconnect House

Tempo Select

Type of Harmony

tab q w e r t y

Octatonic Chromatic Diatonic Pentatonic Quartal

Mon-Quantized * * Mid-East

Sound #

Down Up

Portamento *

Shorter Longer

Pattern Cursor On/Off

Add Patterns

Voicing and Grouping

Patterns Mouse Parallel/Contrary Melodic Motion

Play All or Only New Notes

2x2 / 3x1 Voicing

Breath Ctrl *

Down Up

Foot Ctrl *

Down Up

After Touch *

Down Up

Restore to Initial Values

Alt for small Mac Keyboard: Use Menu

Muting Controls (Numeric Keypad)

1 2 3 0 . Enter

Individual Voices Muting Reverse All On

Interval of Transp.

Down Up Return to C

Velocity

Down Up

Mod Wheel *

Down Up

Loudness *

Down Up

Articulation

Spacebar

Sound On/Off

Don't Play Notes on Key Presses

Mouse Button Suppress Note Playing Until Release