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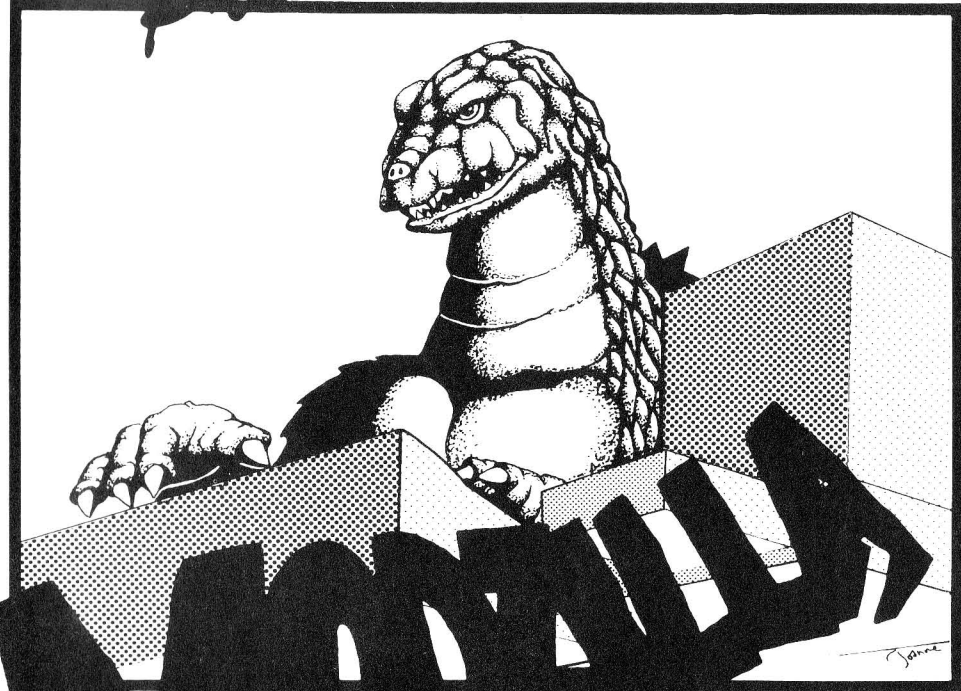
BY
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A MIDI MODULATOR
FOR THE
ROLAND JUNO-106 SYNTHESIZER

MODZILLA

A MIDI MODULATOR FOR
THE ROLAND JUNO-106

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MODZILLA

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Thank you for buying MODZILLA.
Have fun.

To use MODZILLA you need --
> Apple II (with 64K, disk drive and monitor)
> Passport (or compatible) MIDI interface
> Two MIDI cables
> Roland Juno-106 synthesizer
> Joystick or KoalaPad
   (We highly recommend a good joystick with selectable non-centering for accurate and easy control. Our favorite is the C H Products Mach III, which has a push button on the stick's top for convenient one-handed use.)

Make and use a backup copy --
   Use any ProDos copy utility to backup the MODZILLA disk.
   As a matter of principle, MODZILLA is not, and will not be, copy-protected. Please make copies solely for your own use.

Make a data disk --
   There is very little extra room on the MODZILLA disk. You will need a disk formatted with ProDos in order to save your sound groups.

MIDI it all together --
   With the power cord of your Apple unplugged, open the top of the computer and insert the MIDI interface into slot 2   (MODZILLA will only work with the card in slot 2). Connect the IN of your MIDI card to the OUT on the Juno, and the OUT of your MIDI card to the IN on the Juno.

   On the back of the Juno, next to the MIDI jacks, is a switch labeled FUNCTION. <u>Make sure that this</u>

switch is set to position III; otherwise, the Juno is unable to transmit and receive the system-exclusive data which is vital to MODZILLA's operation.

Start it up --

MODZILLA looks best on a monochrome monitor. If you are using a color monitor, turn the color control all the way down.

Place the MODZILLA disk into drive 1 and turn on the power. Once MODZILLA has finished loading, the first thing it will ask you is: "Please send a preset from the Juno."

Whenever a MODZILLA patch is cleared, as it is when you start, MODZILLA needs to know the position of all the Juno sliders. Because there is no way for MODZILLA to ask the Juno for these positions, it is up to you to push one of the blue patch/bank buttons or the manual button on the Juno. When MODZILLA receives the preset, it will display the preset number in the upper right corner of the screen.

If at any time after sending MODZILLA a preset you physically change a parameter on the Juno, a small black box will appear next to the preset number. This lets you know that you have altered the original Juno preset.

If MODZILLA continues asking for a preset after you have pressed a patch/bank button, there is a problem in the MIDI connection. MODZILLA will do nothing until a preset from the Juno is successfully received. Check the FUNCTION switch on the Juno to see that it is set to III. Turn off the Apple's power, and check the MIDI interface and cables.

When your Juno is successfully being modulated by MODZILLA, the preset edit LED's will light in the Juno's display.

The Modules

Along the bottom of the screen there are four boxes, each with its own letter: A, B, C and D. These are MODZILLA's modulation generators or LFO's. We refer to them as modules. This collection of four modules, along with a few other parameters, are what make up a patch. Eight patches make a group.

Only a single module's parameters can be active for editing at any one time. To choose the module you want to edit, move the cursor over any part of that module and press (click) the button. The identifying letter of the selected module will be highlighted.

Waves --

Below the identifying letter in each module is that module's wave icon. To change the wave, move the cursor to the wave selection area above modules A and B. Clicking highlights the wave icon under the cursor and moves that wave into the selected module.

In the wave selection area, there are sixteen different waves from which to choose. The four numbered waves on the left are the library waves, which you can load from the MODZILLA disk. Next to them are the random waves, and finally there are the standard waveforms with their inverted complements. (from left to right: sine, triangle, sawtooth, square and pulse).

Each of the standard waves can be doubled in frequency by clicking on the x2 box. This control is a toggle between normal and doubled frequency of a wave. When a wave is doubled, a small "x" appears under its icon in the module. The library and random waves cannot be doubled.

Pulse Width Slider --

To the right of the wave selection area is a slider labeled P W. This slider controls the width of the pulse wave (the last wave on the right). To change the pulse width, click at any position in the PW slider's box. The cursor will disappear and be replaced with the slider, which can be positioned anywhere within its range as long as you hold the button down. When the button is released, the PW slider is locked into place and the cursor reappears.

Juno Sliders --

To the right of the wave icon in each module there are two windows. These windows hold either one or two Juno sliders for that module. To choose which of the sixteen Juno voice parameters will be modulated, move the cursor to the Juno slider selection area near the top of the screen (just below the menu bar). Clicking highlights the Juno slider name under the cursor and moves that name into the right side window of the selected module.

If there is already one Juno slider name in the module, it will be moved to the left side window. If there are two Juno sliders already chosen, the one on the left is replaced by the one on the right. The one on the right is replaced by the newly selected Juno slider.

If you want to replace two sliders with one, double click on that Juno slider.

Pitch Bend --

The far left icon in the Juno slider selection area represents the Juno's pitch bend lever.

Its control by MODZILLA is similar to the Juno's sliders except that the maximum amplitude of modulation (depth) must be set with the bend sens.

sliders (located directly above the pitch bend lever on the Juno). For most uses, it is a good idea to set the DCO depth to 10 and the VCF depth to 0.

Sliders vs. Switches --

There are two types of parameter controls on the Juno: sliders and switches. MODZILLA only concerns itself with the modulation of sliders. This means that the chorus, range, HPF and other switches cannot be modulated by MODZILLA.

In order to obtain the most pleasure from MODZILLA, a working knowledge of all the Juno's parameters is essential. Spend time with your instrument. There is no other way to learn it.

The Control Panel --

Directly above modules C and D is the control panel. All of the numeric information for each module is entered from this area of the screen.

In the lower left corner of the control panel are the letters A, B, C and D. By clicking on any letter, the corresponding module is selected for editing.

Along the top of the control panel are the abbreviations RTE, DEL, ATK and AMP. Clicking on any of these chooses the corresponding parameter within that module.

To change a parameter's value, click in the control panel slider box. The cursor will become the slider, allowing you to change the number. To increment or decrement the parameter by one, use the arrows on the control panel's lower right.

The current parameter's value is displayed next to its name in the currently selected module and in the bottom center of the control panel. All of the parameters have a range of values from zero to ninety-nine.

Rate (RTE) --

The rate parameter controls the modulation speed of that module. The range is from one, which takes almost twenty-one minutes to cycle through a waveform, to ninety-nine, which cycles through the wave approximately ten times per second (10Hz). A setting of zero stops the module.

Numbers below thirty take over one minute to complete a wave. This is useful to keep in mind if a module does not seem to be doing anything. It is possible to set up the four modules, each with a different rate below ten, so that it will take months to complete a phase cycle!

Delay (DEL) --

The delay controls the time lapse between resetting a module and the beginning of actual modulation. The range is from zero (no delay) to ninety-nine (delay over twenty seconds).

Attack (ATK) --

Once a module has been reset, and the delay time has passed, the attack determines the time it will take for the full modulation depth to be realized.

A setting of zero indicates an immediate attack. Higher numbers will cause a slower attack. If you set the attack to ninety-nine, the module can take more than three minutes to reach the full depth of modulation as set by the amplitude.

Amplitude (AMP) --

The amplitude setting of each module determines the maximum depth of modulation for the Juno slider(s) chosen. Set to ninety-nine, the module has the greatest depth. A setting of zero effectively turns off the module.

The actual range of modulation is determined by this setting and the real position of the Juno slider being modulated. MODZILLA uses the real position of the Juno slider as the zeropoint for the modulating wave. For example, if you are modulating the sub oscillator (SUB) with a sine wave at a full amplitude of ninety-nine, and the real position (zeropoint) of the sub oscillator slider is all the way up (a setting of 10 on the Juno), MODZILLA cannot "move" the slider any higher; therefore you will only hear the down-slope half of the sine wave affecting the sub oscillator.

Loop/One-Shot switch --

In the top right corner of each module is the loop/one-shot switch. This switch determines the effect of a reset upon a module. (see Change Resets on page 14)

When a module is in loop mode, resetting will start modulation at the beginning of its wave and continue through its wave cycle.

When a module is in one-shot mode, resetting will start modulation at the beginning of its wave, go through to the end of one wave cycle, stop modulating, and wait to be reset. If the module's wave is doubled with the $x2$ function, you will hear two cycles of that wave.

When the switch is an oval, the module is in loop mode. If it is a line, then the module is in one-shot mode. To change between modes, simply click on the switch. It will toggle between loop and one-shot.

The Pull Down Menus

File Menu

The File Menu contains the disk functions to save a group of patches, load a group of patches and load library waveforms. The quit option is also in this menu.

What's in a group --
> eight patches
> up to four library waves

Save Group --

To save a group to disk, open the File Menu by moving the cursor to the word "File" on the menu bar at the top of the screen. Press and hold the button to open the menu. Dragging the cursor with the button held down will highlight the different menu options. Move the cursor to Save Group and release the button. The Save Group window will open.

Whenever a disk function window is opened, the first thing MODZILLA does is to check all connected disk drives for ProDos volumes. To speed up this process, we recommend that you place a disk in every disk drive in your system, otherwise ProDos can take up to ten seconds to determine that a drive is empty.

All of the available volume names will appear on the left side of the window. If the volume you wish to save your group to is not in a drive when you choose Save Group, place the disk in any drive and click on Get volumes.

Next, give your group a name. When the cursor is blinking on the top line of the window, enter in a twelve-character name with the Apple keyboard.

(Only letters, numbers and the period are allowed in group names.) Use the delete key or left arrow key to erase characters from the name. The escape key will take you back to the original name.

When you have the name you want, either press Return, click on Save group, or click on the name of the ProDos volume you want to save to. An arrow will appear to the right of the selected volume and an OK capsule will appear in the lower right corner of the window. To change the volume, click on the new volume's name.

Clicking on OK will save your group. Clicking on the Cancel capsule will close the window without saving the group.

Load Group --

To load a group from disk, choose Load Group from the File Menu. When MODZILLA presents you with the online volumes, choose the volume you wish to load from by clicking on its name.

After clicking OK, the volume name will be moved to the top right of the window, and all the available groups in that volume will be listed on the left side.

If there are more than eight groups available, the scroll bar that separates the two halves of the window is shaded. Use the arrows at the top and bottom of the bar to move through the list of group names. The scroll bar itself has not yet been implemented.

When the group you want to load appears in the window, click on its name. An arrow will appear to the right of the name, indicating which group is to be loaded.

Clicking on OK will load your group. Clicking on the Cancel capsule will close the window without loading the group.

When you load a new group, it replaces the group

previously in memory. The edit buffer is not destroyed. (see The edit buffer on page 12)

The edit buffer can be used to move patches between groups. First place the patch you want to move into the edit buffer. Then load the group you want it moved to and save the patch to that group.

Note: Because library waves are saved and loaded with a group, a patch in the edit buffer that uses one or more library waves will probably sound different when a new group is loaded.

Volume RAM --

If you are using an Apple //e with an extended 80-column card, you can save and load groups from the volume RAM. Groups saved to RAM will be lost when you quit MODZILLA. Make sure to save any groups you want to keep onto another volume before quitting.

Load Wave --

Loading a library wave is exactly like loading a group, except that you must specify which wave number (1, 2, 3 or 4) you want to load. You can change the wave number any time before clicking on OK. When you are through loading waves, click on Cancel to exit this window.

When you save a group, any library waves loaded will be saved with that group.

Quit --

To stop working with MODZILLA, choose Quit from the File Menu. MODZILLA will ask if you are sure you want to quit. Click on Yes to quit or No to return to MODZILLA.

Make sure to save any changes you have made before quitting.

Edit Menu

The Edit Menu contains the functions to copy and paste a module, and to clear a module, patch or group.

Copy Module / Paste Module --

By selecting Copy Module, the currently selected module is copied into a buffer. It can later be pasted into any selected module by choosing Paste Module.

Clear Module --

Choosing Clear Module will clear the currently selected module.

Clear Patch --

Clear Patch is an initialization function for the edit buffer.

Choosing Clear Patch will bring up a window: "Are you sure?" Clicking on the YES capsule will clear all four modules in the buffer, set the pulse width back to the center, change the resets to first key down, and set the patch name to its default (Patch n, where n is the current memory position number). MODZILLA will then tell you: "Please send a preset from the Juno." It will do nothing until it receives a preset.

Clear Group --

Clear Group will warn you of your potential loss, and ask if you wish to continue before completely clearing out the eight patches in memory. Clear Group does not initialize the edit buffer.

Patch Menu

The Patch Menu displays the group of eight MODZILLA patches in memory. At the top of the menu is the group name, followed by the name of each patch.

What's in a patch --
> the four modules
> resets   (see Change Resets on page 14)
> position of the pulse wave (PW) slider
> real positions of all the Juno's parameters

The edit buffer --
To play or edit a patch, you must move it from memory to the edit buffer. To do this, simply open the Patch Menu and move the cursor to the name of the patch that you want to play or edit.

If you have not made changes to the patch in the edit buffer, your new choice will immediately be placed into the buffer, ready to be played or edited. If the patch you have chosen to edit has no data, MODZILLA will ask: "Please send a preset from the Juno." MODZILLA will then do nothing until a preset is received.

Along the left edge of the Patch Menu, there is a checkmark next to the name of the patch that is currently in the edit buffer.   If you have just loaded a new group into memory, the checkmark shows the current memory position, not the name of the patch in the edit buffer.

Keep/Forget Changes --
Every time you choose a patch from the Patch Menu, MODZILLA compares the edit buffer to the patch in the current memory position. If there have been any changes, you are presented with the Keep/Forget Changes window.

Across the top of the window is: "You made changes to:" and the name of the patch that is currently in the edit buffer. There is a blinking cursor to the right of the name. The left half of the window lists the eight patches in memory, with a checkmark to the left of the patch you have just chosen in the Patch Menu.

Choosing the Cancel capsule will take you back to the edit buffer as if you had never come to this window.

Forget changes --
To forget any changes you have made click on Forget changes. An OK capsule will appear. Clicking on OK will close the window and place the newly selected patch into the edit buffer.

Keep changes --
If you like the changes, you can place your new patch into any of the eight memory positions.

First you have the option of giving the patch a new name. When the cursor is blinking on the top line of the window, enter in any twelve-character name with the Apple keyboard. Use the delete key or left arrow key to erase characters from the name. The escape key will take you back to the original name.

When you are happy with the name, either press Return or click on Keep changes. An arrow will appear to the right of the current memory position and an OK capsule will appear in the lower right corner of the window.

You can store your new patch in any of the eight memory positions by clicking on the name in that position.   Holding down the button highlights the

name of the original patch in that memory position. When you release the button, your new patch name will replace the original name and the arrow will move to show which memory position your new patch will be saved to.

When your patch is in the correct position, click on OK. MODZILLA will take the contents of the edit buffer, place them into the chosen memory position, close the window, and move the newly selected patch into the edit buffer.

At any time before clicking on OK, you can click on the new patch name to change it or click on Cancel to return to the edit buffer.

Keeping changes only puts your new patch into the computer's memory. To permanently save your patches to disk, you must choose Save Group from the File Menu.

Note: Library waves are not saved with a patch. They are saved only with a group.

Special Menu

The current version of MODZILLA has two choices in the Special Menu: Change Resets and Visualizer.

Change Resets --

The Change Resets option opens up the Reset window. Within this window it is possible to set up the reset condition for each individual module, the pitch bend lever and the Juno sliders. Along the top of the window are their respective icons.

Each of these can be set to a specific reset condition as indicated along the left side of the

window. To change the reset setting, click on the selector dots.

First key down will reset a module or Juno parameter whenever all the keys on the Juno keyboard have been released, and a new key is pressed.

Any key down will reset a module or Juno parameter when any key on the Juno is pressed. Any key down implies first key down.

Trigger will reset a module or Juno parameter whenever the pitch bend lever (LFO trig) is pushed forward. Trigger can be chosen either by itself or in conjunction with one of the key resets.

When **No reset** is chosen, the module or Juno parameter will not be reset.

The reset function is most useful when you are playing the Juno keyboard, rather than putting on the sustain pedal, sitting back and jamming with MODZILLA. Special effects can be set up by putting a module in one-shot mode, and then resetting it with the trigger.

To exit the Change Resets window, click on either the OK capsule (to keep your changes) or the Cancel capsule (to forget changes).

Visualizer --

The Visualizer window lets you see and hear the real positions of all of the Juno sliders and switches.

In the lower left corner of the window (above the OK capsule) is a box labeled MODZILLA. This toggles MODZILLA modulation on and off.

While viewing the Visualizer window, any physical movement of the Juno's sliders or switches is shown. After physically moving a slider on the Juno, a guide is displayed below that slider to help you return it to its original position, if desired.

To exit the Visualizer, click on the OK capsule. It is not possible to cancel any changes made while the Visualizer is in use.

The Creation of *Wobbler* - (a tutorial)

The only way to understand and use the creative power of MODZILLA is to spend time playing with it. If you need help getting started, follow along as we create the patch *Wobbler* and explain a few of MODZILLA's possibilities.

Loading *Wobblertutor* --

If you haven't already, boot MODZILLA and press a patch/bank button on the Juno. Load in the group *Wobblertutor* from the MODZILLA disk. (If you don't know how to load a group, please read the section on the File Menu).

From the beginning --

Open the Patch Menu and choose *Wobbler 1*. When the Keep/Forget Changes window opens, select Forget changes and then click on the OK capsule. MODZILLA will now send the Juno *Wobbler 1*, a fairly standard Juno preset. Play a few notes and chords to familiarize yourself with the sound.

Set the DCO bend sens. slider (on the Juno, above the pitch bender) to 10, and set the VCF bend sens. slider to 0.

Select module A by clicking anywhere in its box. Move the cursor to the left side of the Juno slider selection area and click on the pitch bender icon under the label P B. The icon will appear in the right side slider window of module A.

Click on RTE in module A or the control panel and move the control panel slider to 50. Now click on AMP and move the slider to 64.

Hold a note down and listen. If you hear a sine wave (the default wave) modulating the pitch of the Juno, then you have successfully created *Wobbler 2* !

If not, make sure the MIDI function switch on the Juno is set to III and that your MIDI cables are all in place.

Moving on --

Now select module B, click on the pitch bender icon, choose a square wave by clicking on its box in the wave selection area, set the RTE to 82 and set the AMP to 6. Listen to the Juno.

Whenever the same Juno parameter appears in more than one module, MODZILLA averages together all of the waves controlling that parameter. In this case, the pitch is still being modulated with a medium rate, high amplitude sine wave, but that wave is being averaged together with a high rate, low amplitude square wave creating *Wobbler 3* .

The other *Wobblers* --

In *Wobbler 4* we add filter resonance (RES) to module A, which modulates the resonance with the same sine wave that is currently controlling the pitch bender. The RES slider is also placed into module C with a down sawtooth wave, creating a soft beat.

Wobbler 5 expands upon this with a doubled pulse wave in module D, controlling the filter ENV sensitivity and the SUB oscillator at the same rate as the sawtooth in module C. Module D also uses the attack (ATK) parameter to slowly fade in its effect.

To hear *Wobbler 5*, press and hold a key. At first it sounds exactly like *Wobbler 4*. After a few seconds, you should hear module D beginning to make its presence known.

Wobbler 6 and *Wobbler 7* are more variations of *Wobbler 4*. Listen to both of them and try to determine how each module affects the sound. Notice that in *Wobbler 7*, modules C and D use the delay parameter. There are also three waves being averaged together for the pitch bender.

In *Wobbler 8*, three of the modules (A, C and D) are set to one-shot mode. If you open the Change Resets window from the Special Menu, you will see that module A is set to reset on First key down, and modules C and D will reset on both the Any key down and Trigger conditions. Try playing *Wobbler 8* by holding down a chord and pushing forward the LFO trigger, or hold a chord with your left hand and play some notes with your right hand.

Don't stop now --

All it takes is a willingness to experiment to enjoy MODZILLA to its fullest. Try everything. Don't be afraid. At worst, you may get a sound you don't like. At best you'll have gobs o' fun.

If you have any questions about MODZILLA, feel free to write. We'll do our best to help solve your problems, open your creative blocks and make your world a better place to be.

The MODZILLA Screen
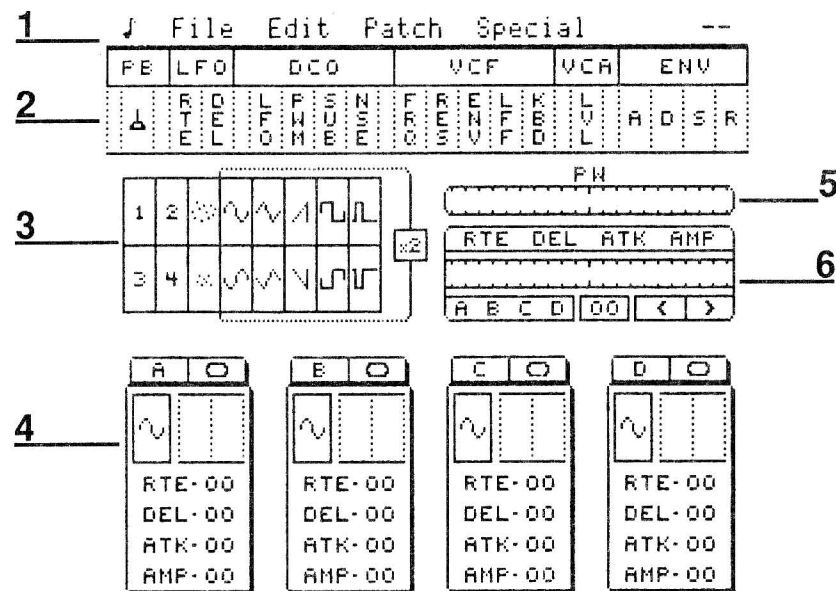
1 -- Menu Bar
2 -- Juno Slider Selection Area
3 -- Wave Selection Area
4 -- Modules
5 -- Pulse Width Slider
6 -- Control Panel

Notes

Random Waves --

The random waves work a bit differently than other waves regarding rate.

A rate of 50 is the top speed for random waves. Any higher value will not change the rate of the wave, but will change the length of its cycle. This is only apparent when the module is in one-shot mode.

Visualizer note --

While using the Visualizer you will notice the occasional inaccuracy of your Juno's sliders. This is attributable to two causes.

First, when MODZILLA is sending lots of data to the Juno, the synthesizer is kept so busy changing parameters that it does not respond as immediately to physical slider movements.

Second, the sliders on the Juno are mechanical potentiometers whose positions are converted into digital information. Like all mechanical parts, the sliders become dirty and less accurate with time. The Visualizer's representation of a slider's position is precisely where the sound-generating circuitry of the Juno says it is, which may or may not correspond to the exact physical slider position.

Aliasing? What aliasing? --

The waves that MODZILLA uses for modulation are digital. Each one, except for the random wave, is a table of 256 numbers that describe the waveshape. More that fifty times each second, MODZILLA changes the Juno's sliders, using these wavetables as a guide.

At faster rates, usually above 85, a phenomenon called aliasing becomes noticeable. In order for MODZILLA to have rates up to 10Hz, it is necessary to skip numbers in the wavetable. This can lead to some very strange, but potentially musically useful, waves being generated.

The x2 function alleviates some aliasing in the standard waveforms by using an alternate wavetable where the frequency of the wave is doubled.

Have Fun --

One of our favorite ways to use MODZILLA is to put a footswitch or 1/4 inch plug in the sustain pedal jack, press a few notes, then sit back and play.

Write and let us know what you are doing with MODZILLA. Enjoy yourself.

A BIG MODZILLA THANKS TO:

Stephanie Allen -- Steve Arnold -- Donny Blank -- Joanne Bloomfield -- Eric Cleveland -- Bob Cowart -- Doug Crockford -- Steve Cummings -- Bill Fancher -- Mike Garvey -- Gypsy the Cat -- Alden Jenks -- Teg Lenker -- Milt-the-Rat -- Alan Rath -- Bryan Rogers -- Steve Savage -- Tim Schmidt -- Lisa Stouder -- Joe West -- Steve Wilson