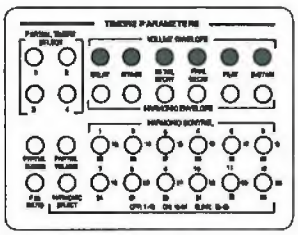
Modifying partial timbres

SA-06-1288

The volume envelope

A **volume envelope** allows you to alter, within certain limits, the attack, sustain and decay of the keyboard patch.

When you modify the volume envelope of a partial timbre with a keyboard patch , all the sound files in the patch are affected by the new volume envelope.



VOLUME ENVELOPE buttons panel 1

Changing the volume envelope

The Synclavier volume envelope consists of five time segments and two volume levels. When you program a volume envelope for a keyboard patch partial timbre, the new volume envelope must stay within the volume limits of the original sound files in the timbre. That is, you can lower the volume of any segment of the partial timbre but you cannot raise it.

Time intervals

delay Time from key depression to beginning of sound.

attack Time from beginning of sound to peak volume.

initial decay Time from peak volume to beginning of sustain volume.

sustain Time from end of initial decay to beginning of final decay.

final decay Time from key release to end of sound.

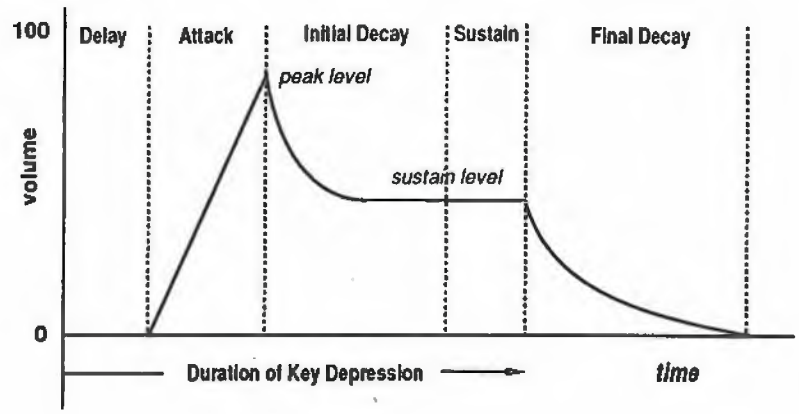
Volume levels

peak Relative volume at the change from attack to initial decay.

sustain Relative volume from end of initial decay to key release.

You program the volume envelope using either the six VOLUME ENVELOPE buttons on panel 1 of the keyboard control panel or the Numeric Timbre Display.

Typical volume envelope



Timbre Display

NUMERIC TIMBRE DISPLAY

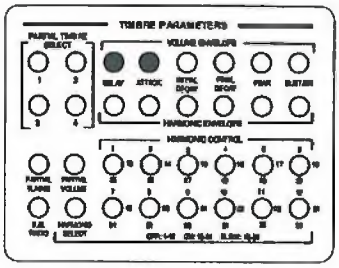
Press arrow key to move cursor and enter value. Press <ENTER> for Main Menu.
Select Display — Graphic Numeric Partial Timbre Timbre Frame 3D Hardcopy

Timbre: 1-7-5: "SAX/GUITAR 2.29"

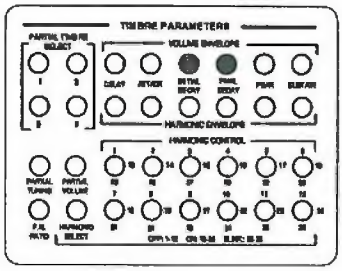
		Delay	Attck	IDec	FDec	Peak	Sust	1st 12 Harmonic Coefficients
1.	V	0	0	0	200	100.0	100.0	
	H	0	0	0	0	0	0	
2.	V	0	0	0	61	100.0	100.0	
	H	0	0	0	0	0	0	
3.	V							
	H							

	Partial				Vibrato					Stereo			
	Tuning	Volume	FM Rat	Chorus	Wave	Rate	Depth	MDep	Attk	IOB	Wave	Rate	Dep	Pan
1.	439.0	100.0	0.000	1.000	Sin	0.00	0.00	0.00	0		0	0.10	50	0
2.	440.0	60.0	0.000	1.000	Sin	0.00	0.00	0.00	0		0	0.00	0	0
3.														

The volume envelope (con't)



DELAY, ATTACK
panel 1



INITIAL DECAY, FINAL DECAY
panel 1

Setting the volume envelope time intervals

1. Select the partial timbre you want to change by pressing the appropriate PARTIAL TIMBRE SELECT button.

2. Press the DELAY button, if you want the sound to start after the key is depressed.

   The button lights.

3. Turn the control knob to select a delay time between 0 and 30,000 milliseconds.

   The value appears in the display window.

4. Press the ATTACK button to set the time interval between the beginning of the sound and the peak of the volume envelope.

   The button lights.

5. Turn the control knob and select an attack time interval between 0 and 15,000 milliseconds.

   The value appears in the display window.

6. Press INITIAL DECAY and turn the control knob to select an initial decay time interval between 0 and 30,000 milliseconds.

7. Press FINAL DECAY and turn the control knob to select a final decay time interval between 0 and 30,000 milliseconds.

Setting the volume envelope volume levels

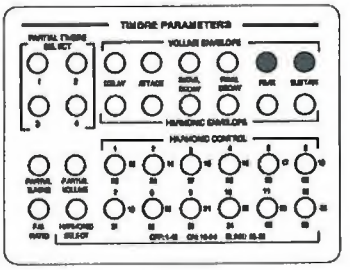
Once the time intervals are programmed, set the volume levels.

1. Press PEAK and turn the control knob to select a peak volume level between 0 and 100.0.

   The value selected appears in the display window. A setting of zero gives no peak volume; a setting of 100.0 gives maximum peak volume.

2. Press SUSTAIN and turn the control knob to select a sustain volume level between 0 and 100.0.

   The value selected appears in the display window. A setting of zero gives no sound at all; a setting of 100.0 gives maximum sustain volume.



PEAK, SUSTAIN panel 1

Vibrato

The partial timbre can be enhanced by adding vibrato which changes the pitch of a note as it is being played. All sound files of the keyboard patch are affected.

Vibrato wave shapes

You can control the shape of the pitch change by selecting a **vibrato wave** shape. The pitch of the note goes up and down in a shape selected using the **vibrato wave** parameter. This shape is repeated at a rate determined by the **vibrato rate** parameter.

There are six* different vibrato wave shapes as shown on the opposite page. Each wave shape can be inverted using the VIBRATO INVERT button.

Random wave shapes generate a continuous and random set of pitches changing at a rate determined by the vibrato rate setting and falling within the range determined by the vibrato depth setting. When using either of the random wave settings, you will probably never get exactly the same wave shape twice.

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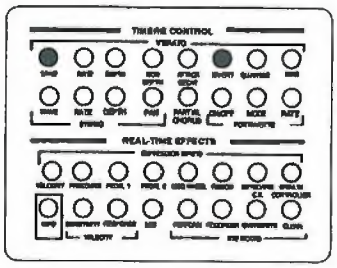
* Each wave shape is repeated for use with FM synthesis timbres. See the manual FM Synthesis.

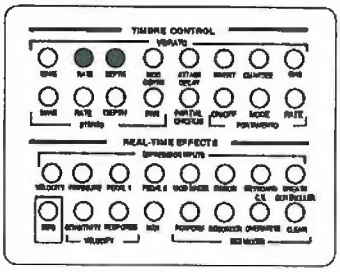
Vibrato wave shapes

vibrato wave #	*wave shape*
1	sine
2	triangle
3	ramp
4	inverted ramp
5	square
6	sine2
7	triangle2
8	ramp2
9	inverted ramp2
10	square2
11	random
12	random2

Vibrato (con't)



VIBRATO WAVE, INVERT panel 5



VIBRATO RATE, DEPTH panel 5

Setting the vibrato

1. Select the partial timbre(s) to be modified.
2. Press the VIBRATO WAVE button.

   The button lights, and the display window shows

   1–SINE
   [timbre name]

3. Use the control knob or press the VIBRATO WAVE button repeatedly to select one of the twelve vibrato wave shapes.
4. Invert the selected wave, if desired, by pressing VIBRATO INVERT.
5. Press the VIBRATO RATE button.

   The button lights, and the display window shows

   [number] HERTZ

6. Use the control knob to select a vibrato rate between 0.00 and 50.00 hertz.
7. Press the VIBRATO DEPTH button.

   The button lights and the display window shows

   [number] SEMITONES

8. Use the control knob to select a vibrato depth between 0.00 and 24.00 semitones.

Setting the vibrato (con't)

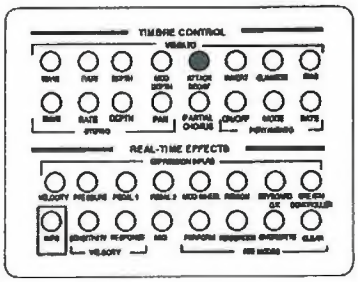
9. If you want to change the slope of the vibrato attack, press the VIBRATO ATTACK button.

   The button lights and the display window shows

   [number] MILLISEC

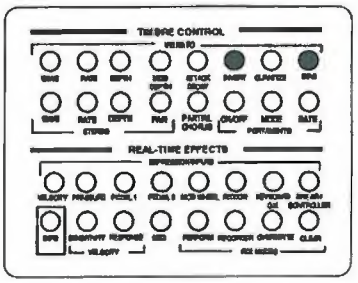
10. Use the control knob to select a vibrato attack delay between zero and +10,000 milliseconds (10 seconds).

    The vibrato increases gradually to its full depth from the beginning of the note to the selected attack time.



VIBRATO ATTACK
panel 5

Vibrato (con't)



VIBRATO INVERT, BIAS panel 5

Biasing the vibrato

Normally, when vibrato is added to a partial timbre, the pitch of each note fluctuates an equal amount above and below the pitch of the key pressed. The total range in semitones is determined by the **depth setting.**

You can create a vibrato in which the pitch fluctuation is entirely above the key pressed.

1. Press VIBRATO BIAS.

   The button lights.

2. Play a note.

   The lowest point of pitch fluctuation is the pitch of the note played; the highest point is twice the number of semitones set by the vibrato depth setting higher.

You can create a vibrato in which the pitch fluctuation is entirely below the key pressed.

1. Press VIBRATO BIAS.

   The button lights.

2. Press VIBRATO INVERT.

   The button lights.

3. Play a note.

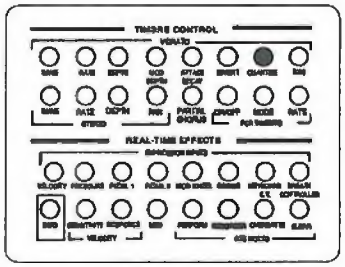
   The highest point of pitch fluctuation is the pitch of the note played; the lowest point is twice the number of semitones set by the vibrato depth setting.

Quantizing the vibrato

Normally, the fluctuations in pitch produced by a vibrato are smooth and gradual. When the quantize function is turned on, however, the fluctuations in pitch are quantized, or stepped, in semitone intervals.

1. Set the vibrato wave, depth and rate as desired.

2. Press VIBRATO QUANTIZE.



QUANTIZE
panel 5

You can combine quantized vibrato with either the **repeat** or **arpeggiate** functions or both for special effects.

1. Press REPEAT/ARPEGGIATE RATE.

2. Select a rate with the control knob that is integrally related to, but not necessarily identical with, the vibrato rate.

3. Press REPEAT.

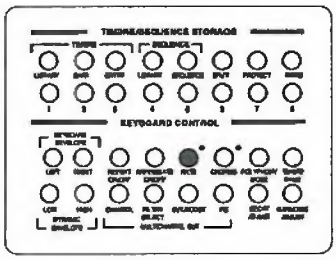
4. Play a note.

   As you hold down the note, it is repeated at the repeat rate. Each repeat sounds on different quantized pitches according to where in the vibrato cycle each repeated note occurs.

5. Press ARPEGGIATE.

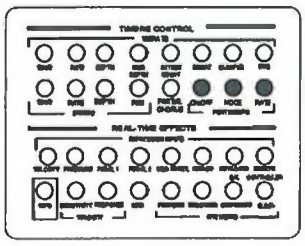
6. Play a chord.

   As you hold down the keys, notes are repeatedly arpeggiated. The notes occur at varying pitches according to where they occur in the vibrato cycle .



REPEAT, ARPEGGIATE, RATE
panel 4

Portamento and amplitude modulation



PORTAMENTO ON/OFF, MODE, RATE panel 5

Portamento

When portamento is added to a partial timbre, each note glides to the next. You can program the pitch curve of the glide to be either linear or logarithmic.

1. Select the partial timbre(s) to contain the portamento function.

2. Press the PORTAMENTO ON/OFF button to turn on the portamento function.

3. Press PORTAMENTO MODE to select the logarithmic mode, if desired.

   When the PORTAMENTO MODE button is lit, the pitch curve of the portamento is logarithmic. When the PORTAMENTO MODE button is not lit, the pitch curve of the portamento is linear.

4. Press the PORTAMENTO RATE button.

   The button lights, and the display window shows

   [number] GLIDE

5. Use the control knob to select a portamento rate between 0.000 and 1.000.

At a rate of 0.000, it takes almost a minute for a pitch to travel from one pitch to another. At a rate of 1.000, the change between one pitch and the next is instantaneous.

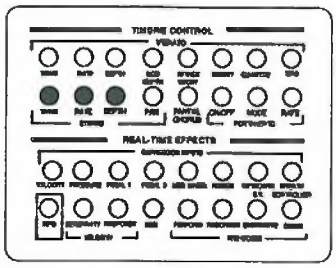
Amplitude modulation or tremolo

Amplitude modulation, or **tremolo**, can be thought of as a periodic variation in volume.

There are four tremolo modes: two attack modes and two decay modes. The attack modes cause a note to begin at a low volume point and rise to full volume. The note then continues to fluctuate at a specified rate. The decay modes cause a note to begin at full volume and decrease to a specified low point.

Both attack and decay modes can be either synchronous or independent. In the synchronous mode, all notes are loud and soft at the same moment. In the independent mode, each note begins its cycle independently.

Amplitude modulation (con't)



STEREO WAVE, RATE, DEPTH panel 5

Adding amplitude modulation

1. Select the desired partial timbre(s).
2. Press the STEREO WAVE button.

   The button lights. The display window shows

   0–STATIONARY

3. Use the control knob or press the STEREO WAVE button repeatedly to select one of the four amplitude modulation modes (see table opposite).
4. Press the STEREO RATE button.

   The button lights. The display window shows

   [number] HERTZ

5. Use the control knob to select a rate between 0.0 and 6.0 hertz.
6. Press the STEREO DEPTH button.

   The button lights. The display window shows

   [number] ST DEPTH

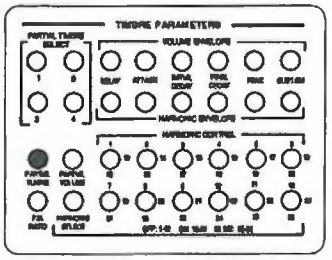
7. Use the control knob to select a tremolo depth between 0 and 50.

   With a depth setting of 0, the amplitude does not fluctuate at all. With a depth setting of 50, the amplitude fluctuates between the full programmed volume level and zero.

Note: When using amplitude modulation settings, the other functions of the **stereo wave** button are not available to the selected partial timbre.

Amplitude modulation modes

mode displayed	*mode definition*
21–SYNC AM ATTACK	Synchronous attack mode. Tremolo begins at lowest volume point and rises to full volume. Modulation is synchronized for all notes.
22–IND AM ATTACK	Independent attack mode. Tremolo begins at lowest volume point and rises to full volume. Modulation is independent for each note.
23–SYNC AM DECAY	Synchronous decay mode. Tremolo begins at full volume and falls to lowest point. Modulation is synchronized for all notes.
24–IND AM DECAY	Independent decay mode. Tremolo begins at full volume and falls to lowest point. Modulation is independent for all notes.



PARTIAL TUNING panel 1

Partial timbre tuning

Each partial timbre can be individually tuned to create harmonic relationships, phase shifts or complex modulations.

1. Press the PARTIAL TUNING button.

   The button lights, and the display window shows

   [number] HERTZ

2. Use the control knob to select a new pitch from 0.0 to 1760.0 in 0.1 hertz increments. (A above middle C is 440.0.)

   Or press the PARTIAL TUNING button repeatedly to increment the partial tuning in octaves:

   110.0 220.0 440.0 880.0 1760.0

You can establish constant tuning for a partial timbre by dialing in a negative number. In this case, the partial timbre sounds at the pitch specified to the right of the minus sign, regardless of what note is played. This makes it possible to create effects such as a guitar timbre that has the constant sound of the pick on one partial timbre while the remaining partial timbres contain the pitched guitar sound.

Partial timbre volume

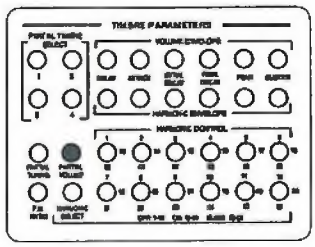
The volume of each partial timbre can be individually adjusted.

1. Press the PARTIAL VOLUME button.

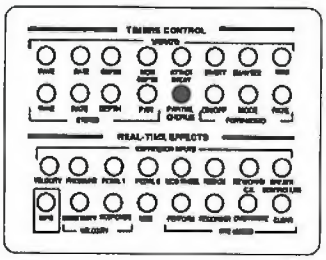
   The button lights, and the display window shows

   [number] PARTIAL V

2. Dial a number between 0 for no volume to 100 for full volume.



PARTIAL VOLUME
panel 1



PARTIAL CHORUS panel 5

Partial chorus

The partial chorus function adds another voice to the selected partial timbre without affecting the other partial timbres in the timbre. The additional voice, which contains an identical set of harmonic coefficients, can then be tuned to any desired relationship with the selected partial timbre.

1. Select the PARTIAL CHORUS button.

   The button lights, and the display window shows

   [number] PAR CHOR

2. Use the control knob to select a partial chorus setting between 0.000 and 10.000.

The number dialed in establishes the interval above or below the pitch of the selected partial timbre, with 1.000 representing a unison.

You can achieve phase shift effects (flanging) by tuning the added voice to a pitch very near the fundamental or an octave harmonic or subharmonic. A setting of 1.003 or 0.998 results in difference tones which are below the audible range, but are noticeable as phase shift in the upper harmonics of the tone.

You can reinforce the existing harmonics of a tone by dialing in an integer as shown in the table on the opposite page.

Inharmonic frequencies producing harsh effects can be added by selecting certain non-integer values.

partial chorus setting	*relationship of added voice to fundamental frequency*
0.125	three octaves below
0.250	two octaves below
0.500	one octave below
1.000	unison
1.125	major third above
1.500	perfect fifth above
2.000	second harmonic (octave above)
3.000	third harmonic (octave plus a perfect fifth above)
4.000	fourth harmonic (two octaves above)
5.000	fifth harmonic (two octaves plus a major third above)
6.000	sixth harmonic (two octaves plus a perfect fifth above)
7.000	seventh harmonic (two octaves plus a minor seventh above)
8.000	eighth harmonic (three octaves above)
9.000	ninth harmonic (three octaves plus a major second above)
10.000	tenth harmonic (three octaves plus a major third above)

Keyboard envelope

A keyboard envelope places a partial timbre on a particular section of the keyboard. You can place different partial timbres on overlapping or separate sections of the keyboard. For special effects, you can assign completely different sounding partial timbres to different sections of the keyboard. Or you can use this feature to develop whole timbres, such as piano or strings, that may be played up and down the keyboard with authenticity throughout.

The range of the keyboard to which a partial timbre is assigned consists of three parts:

- the full volume area,
- the lower fade area,
- the upper fade area.

The fade areas are defined by upper and lower end points for the full-volume area (key numbers 10-85) and the fade area length (half-steps 0-85).

Setting the upper limit of a keyboard envelope

1. Press and hold the RIGHT KEYBOARD ENVELOPE button.

2. Select an upper end point for the full-volume area by pressing a key.

   The display window shows

   [number] RIGHT KEY

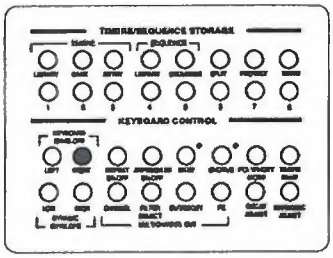
3. Continue to hold the RIGHT KEYBOARD ENVELOPE button and press a key to the right of the previously marked end point.

   Notes within the defined fade area become louder from right to left. Notes to the right of the defined fade area do not sound. The display window shows the length of the fade area computed in half-steps

   [number] RGHT FADE

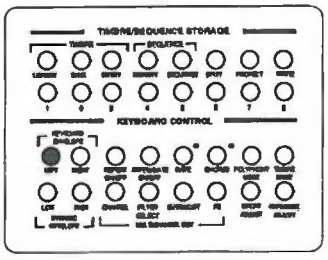
If no fade area is desired, press the same key twice. The fade area length is set to zero.

You can use the control knob to change a number once the keyboard key is pressed. Numbers outside the keyboard range can be selected, allowing keyboard envelopes to be defined for MIDI controllers with larger keyboards.



KEYBOARD ENVELOPE RIGHT panel 4

Keyboard envelope (con't)



KEYBOARD ENVELOPE LEFT panel 4

Setting the lower limit of a keyboard envelope

1. Press and hold the LEFT KEYBOARD ENVELOPE button.

2. Select a lower end point for the full-volume area by pressing a key.

   The display window shows

   [number] LEFT KEY

3. Continue to hold the LEFT KEYBOARD ENVELOPE button and press a key to the left of the previously marked end point.

   Notes within the defined fade area become louder from left to right. Notes to the left of the defined fade area do not sound. The display window shows the length of the fade area computed in half-steps

   [number] LEFT FADE

If no fade area is desired, press the same key twice. The fade area length is set to zero.

You can use the control knob to change a number once the keyboard key is pressed. Numbers outside the keyboard range can be selected, allowing keyboard envelopes to be defined for MIDI controllers with larger keyboards.

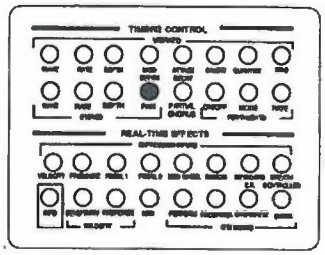
Stereo

With stereo, you can balance the dual outputs of each individual timbre precisely, placing each partial timbre on any of 100 locations between left and right speakers. Thus a timbre with four partial timbres can appear to come from four different locations. When a sequence is played, sounds can appear to come from as many locations as you have voices in your Synclavier.

You can also program each partial timbre so that it moves around during live performances or playback of recorded sequences. A partial timbre can move according to key location or it can automatically pan from speaker to speaker during held notes. One partial timbre can move from left to right while others move in reverse direction. Or, by proper positioning of the speakers, some sounds can move toward the listener while others recede.

Stereo settings for each partial timbre are saved when you store a timbre on disk. This information is also recorded when you create a sequence. You can also add stereo to old recorded sequences simply by adding stereo to the timbres in them.

Stereo (con't)



STEREO PAN
panel 5

Static stereo

By default, a static stereo image is present on a partial timbre. Each note played appears to come from the center of the stereo image.

You can change the stereo position.

1. Press the STEREO PAN button.
2. Dial the center position setting in the range of -50 (full left) to +50 (full right).

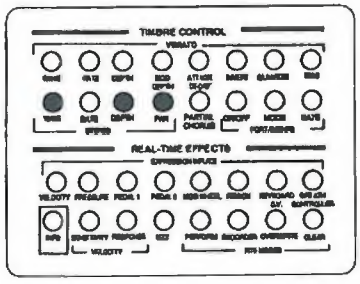
You can reset the panning center to zero.

- Press the STEREO PAN button twice.

Moving stereo

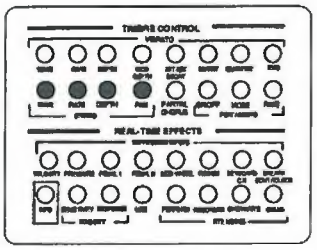
The stereo position can also serve as a centerpoint for a moving sound. The pattern, range and centerpoint of the movement are programmed by the buttons WAVE, DEPTH and PAN. The actual movement is determined by either the specific keys played (modes 3 and 4) or the RATE button (modes 5 and 6, 9 through 12, and 15 through 18).

1. Press WAVE.
2. Dial in a number for a stereo panning mode or waveform selected from the table below; or press the WAVE button repeatedly to step through the mode numbers.
3. Press STEREO DEPTH.
4. Dial in a stereo panning depth from 0 to 50 panning units.
5. Press PAN.
6. Dial in a center position for the moving stereo within the range of -50 (full left) to +50 (full right).



STEREO WAVE, DEPTH, PAN panel 5

Stereo (con't)



STEREO WAVE, RATE, DEPTH, PAN panel 5

Automatic panning

In the automatic panning modes, the output moves around in the stereo image at a set rate while you hold down a key.

Modes 9-12 are **synchronous modes.** All notes in a chord are panned together. As you add each new note, the panning picks up at the point in the panning cycle where panning for the previous note left off.

Modes 15-18 are **independent modes.** The panning of each note starts at the beginning of the panning cycle, at the designated centerpoint for the partial timbre.

1. Press STEREO WAVE.
2. Select one of the automatic panning modes by dialing in the appropriate number for the selected mode.
3. Press STEREO RATE.
4. Set the panning rate by dialing in a rate from 0.0 to 6.00 hertz.
5. Press STEREO DEPTH.
6. Set the panning depth by dialing in a depth from 0 to 50 panning units.
7. Press STEREO PAN.
8. Change the center position, if desired, by dialing in a center position from -50 (full left) to +50 (full right).

NOTE: With a depth or rate of 0, there is no automatic panning.

#	mode definition
0	Output of the partial timbre remains at defined stereo center position. (Default mode)
1,2	Reserved for future use.
3	Stereo positions mapped to keys on the keyboard. With default center position of 0 and depth setting of 50, centerpoint is at F# above middle C, with lower notes to the right and higher ones to the left. Both centerpoint and depth settings can be adjusted.
4	Mirror image of mode 3.
5	Automatic ping-pong panning between right andleft ends of panning range with each new note triggering a move to the opposite end.
6	Mirror image of mode 5.
7,8	Reserved for future development.
9	Synchronous automatic panning using a sine wave. Panning moves from centerpoint to the right and then to the left.
10	Mirror of mode 9.
11	Synchronous automatic panning using a square wave. Panning moves from centerpoint to the right and then to the left.
12	Mirror of mode 11.
13,14	Reserved for future development.
15	Independent automatic panning using a sine wave. Panning moves from centerpoint to the right and then to the left.
16	Mirror of mode 15.
17	Independent automatic panning using a square wave. Panning moves from centerpoint to the right and then to the left.
18	Mirror of mode 17.
19	Random panning with each note placed at a random position within the panning range.
20	Mirror of Mode 19.