

# Chapter 2. Applications

This chapter explains the creation and editing of tone data, as well as how to combine the tones for a variety of setting and effects.

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# 2-1 K4/K4r Structure of Patches

## K4/K4r Configuration

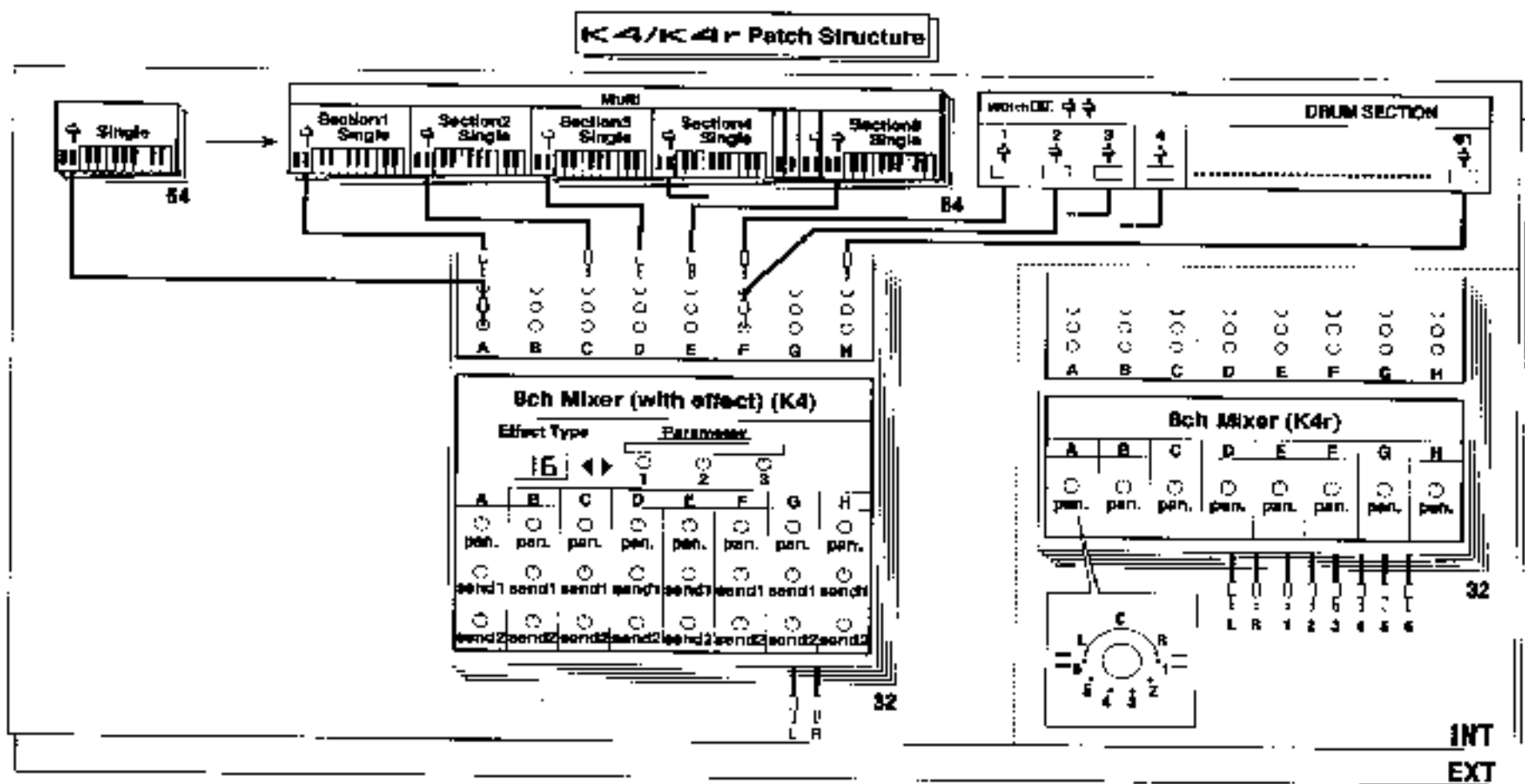
Besides SINGLE and MULTI Patches, the K4 contains 32 EFFECT Patches; the K4r contains 32 OUTPUT Patches.

As shown in the structure, it is possible to feed the signal from a SINGLE Patch into the desired SUBMIX Channel (lettered A to H).

It is also possible to feed the signal from each of the eight Sections of a MULTI Patch into the SUBMIX Channel in the desired fashion.

Furthermore, one may feed each of the 61 tones of the DRUM Section into the SUBMIX Channels as with the SINGLE and MULTI patches.

The following structure shows the K4/K4r Patches.



**Notes:** SUBMIX CH can be programmed to overlap. For example, the output signal from all eight Sections of a MULTI Patch can be fed into a single SUBMIX CH.

An EFFECT (K4) or OUTPUT (K4r) Setting number can be stored for each SINGLE and MULTI Patch. For SINGLE Patches see P. 33; for MULTI Patches see P. 61 and for DRUM Section see P. 68.

# 2-2. The Tone Editing Process

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The K4/K4r has many programmable parameters. When creating or editing sounds it is best to start with a goal and work to reach that goal.

- **Find a tone to serve as a basis for editing.**

Though 'sound creation' may be your goal, creating a tone from scratch is generally quite difficult. It is easier and more effective to find and modify a preset tone which is close to the one you're attempting to create. Since the preset tones have been designed to make full use of the K4/K4r's capabilities, one can learn quite a bit about sound creation on the K4/K4r by modifying them.

- **Decide how to alter the tone.**

If you set a goal for editing then you will know which parameters must be altered. For example, if you wish to change the attack or some other amplitude parameters, then you must alter the DCA; to make the tone more or less brilliant, you must modify the DCF.

- **Change the waveform.**

It is possible to alter the feel of a tone by simply altering the waveform, even if all other parameters are unchanged. If a similar waveform is selected, the change will be subtle; using a much different waveform will create a very different sound.

- **Combine sounds.**

You can make use of MULTI PLAY in sound creation as well, to create a wide variety of sounds. You can layer the same sound and perhaps detune the pitch a little, to create a sound much deeper than the original tone alone. Or you can combine a number of different tones to create an orchestra-like sound. The possibilities are limited only by your imagination.

- **Add effects (K4 only).**

There are usually effects added to sounds such as those you hear on the radio or CD's. Effects are an important element in the creation of complete, polished sounds. The K4r is designed to be used with external effects devices.

- **Manipulate settings.**

Manipulating settings such as Velocity and Modulation, especially in combination in a MULTI Patch, can create even more realistic and sophisticated sounds.

## 2-3. Saving and Loading Data

The memory of the K4/K4r can hold 64 SINGLE Patches and 64 MULTI Patches (the latter containing up to 8 single tones each), for a total of 128 patches, plus DRUM Section and EFFECT (K4) or OUTPUT (K4r) Settings. At the time your synthesizer left the factory, the "factory presets" (a selection of patches and settings designed to make good use of the K4/K4r's capabilities) were stored in its memory. You will find that editing these tones to create new ones suiting your taste an easy and pleasant task. Tones so edited can be stored in the memory, and will be described later; but the data originally stored there will be erased. In case you want to keep the factory presets, you should either store them in an optional card (DC-16) or copy them by MIDI DATA DUMP into a computer or a sequencer such as the Q-80.

**Notes:** Be sure to use only the designated memory card (DC-16).  
When using a card, please read the accompanying instruction manual carefully.

Do not cut the synthesizer's power during a LOAD or SAVE operation, as it may destroy any data stored in the card and/or the synthesizer's memory.

Should you wish to SAVE or LOAD individual patches, or DRUM Section, EFFECT (K4) or OUTPUT (K4r) Settings, please refer to the descriptions of the WRITE operations in each section. (For SINGLE Patches, see P. 58; for MULTI Patches, see P. 65; for EFFECT (K4) or OUTPUT (K4r) Settings, see P. 76; and for the DRUM Section, see P. 70.)

### CARD FORMAT

New cards and cards which have been used in other machines must be formatted before they can be used with the K4/K4r.

**Note:** When the FORMAT procedure is performed, all data already stored in the card will be erased. PROTECT will not work when formatting, so be sure to check the contents of a card before you format it.

#### <Procedure>

- (1) Insert the card into the card slot (in the rear panel of the K4, or the front panel of the K4r) so that the ▼ mark and the ▲ mark are aligned.
- (2) Press  repeatedly until CARD FORMAT appears on the display.
- (3) Press  to FORMAT, or  to quit.
- (4) If you press , the message SURE? will appear on the display to ask for confirmation.
- (5) Press  again to continue, or  to quit.
- (6) Continue with the SAVE operation.

CARD FORMAT  
EXEC? = Y/N

CARD FORMAT  
SURE? = Y/N

COMPLETED!

CANCELED!

## DATA SAVE

This procedure copies all patch, EFFECT (K4) or OUTPUT (K4r) Setting and DRUM Section data from the synthesizer to the card.

**Note:** When the SAVE procedure is performed all data already stored in the card will be erased.

```
SAVE TO CARD
EXEC? = Y/N
```

+YES

```
COMPLETED!
```

-NO

```
CANCELED!
```

### <Procedure>

- (1) Press **WRITE** repeatedly until SAVE appears on the display.
- (2) Press **+YES** to SAVE, or **-NO** to quit.
- (3) If you press **+YES**, the message SURE? will appear on the display to ask for confirmation.
- (4) Press **+YES** again to continue, or **-NO** to quit.
- (5) Press **WRITE** repeatedly until card PROTECT appears on the display.
- (6) To protect the card data, set the memory PROTECT switch to ON.  
(See DATA LOAD below)

## DATA LOAD

This procedure copies all patch, EFFECT (K4) or OUTPUT (K4r) Setting and DRUM Section data from the card into the synthesizer.

**Note:** When the LOAD procedure is performed all data already stored in the synthesizer will be erased.

```
INTERNAL
PROTECT = ON
```

```
LOAD FROM CARD
EXEC? = Y/N
```

```
LOAD FROM CARD
SURE? = Y/N
```

+YES

```
COMPLETED!
```

-NO

```
CANCELED!
```

### <Procedure>

- (1) Insert the card into the card slot (in the rear panel of the K4, or the front panel of the K4r) so that the ▼ mark and the ▲ mark are aligned.
- (2) Press **WRITE** repeatedly until internal PROTECT appears on the display.
- (3) Press **-NO** to turn the PROTECT switch to OFF.
- (4) Press **WRITE** repeatedly until LOAD appears on the display.
- (5) Press **+YES** to LOAD, or **-NO** to quit.
- (6) If you press **-YES**, the message SURE? will appear on the display to ask for confirmation.
- (7) Press **+YES** again to continue, or **-NO** to quit.
- (8) To protect internal patch data, return the Internal PROTECT switch to ON.

## 2-4. Before Entering EDIT Mode

### The Basics of Editing

Editing is the creation or alteration of synthesizer tones and settings. This operation can be performed in the EDIT mode.

**Note:** You will need to use the WRITE operation to store edited data for future use.

```

TONE WRITE
TO           =IA-1
  
```

```

TONE WRITE
EXEC? =Y/N
  
```

**Note:** Data that is not stored using the WRITE operation will not be changed in the memory. Therefore, feel free to try editing the preset data and see how each setting change affects the actual sound produced.

### How to Enter EDIT Mode

You may edit SINGLE patches in SINGLE EDIT mode, and MULTI Patches in MULTI EDIT mode. Entering EDIT mode is the same in either case.

```

SINGLE
IA-1  C. Grand
  
```

```

SIA-1 C. Grand
VOLUME      =100
  
```

#### <Procedure>

- (1) Call up the patch to be edited on the display.
- (2) Press **EDIT** to enter EDIT mode.

### Calling up Parameters and Assigning Values on the K4/K4r

Parameters are divided into groups according to function, and then assigned to various switches.



- NO    + YES

#### <Procedure>

- (1) The parameter groups are assigned to switches A, B, C, D, and 1 through 16 on the panel. Press the switch for the proper parameter group repeatedly until the desired parameter appears on the display.
- (2) If you accidentally pass the parameter you want, press **PREV** to return to it.
- (3) The VALUE Slider may be used to change the value greatly; to change it slightly, press **- YES** OF **- NO**.
- (4) To compare the edited sound with the original, press **RECALL COMPARE**. The value before editing will appear on the display, and by playing the keyboard you can hear the original sound.
- (5) Press the **RECALL** again to continue editing.
- (6) To stop editing, press **SINGLE** OF **MULTI**.

RECALL

**Note:** If you accidentally leave EDIT mode, press **RECALL**. The display (shown on the left) will appear, and you can return to EDIT mode by pressing **EDIT**.

## 2-5. Editing a SINGLE Patch

### 1. SINGLE Patch Configuration

---

This section describes the process from the pressing of a key on the keyboard (that is, the reception of a KEY ON signal) to the actual production of a sound, and explains how each part of the K4/K4r operates.

#### ■ The Sound Production Process

The K4/K4r configuration consists of three blocks: DCO, DCA, and DCF. The K4 adds a fourth, EFFECT.

##### ● DCO

The DCO receives information from the keyboard concerning which key is pressed, and outputs the preselected basic tone (either DC or PCM waveform) at the pitch of the key that was pressed.

##### ● DCA

The DCA adjusts the volume of the signal sent from the DCO. It does not merely set the output volume of the signal; it determines the change in the signal's volume over a period in time as well.

##### ● DCF

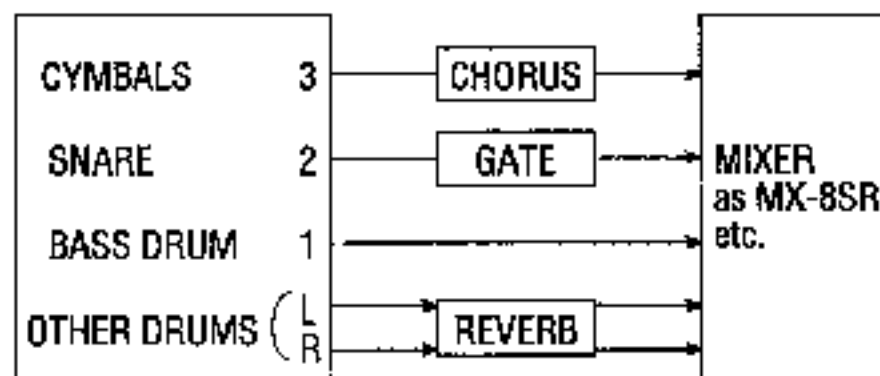
The DCF adjusts the sound quality of the tone sent from the DCA. The DCF basically operates like a tone control; however, they are essentially different in that the DCF adjustment can be set to vary over time.

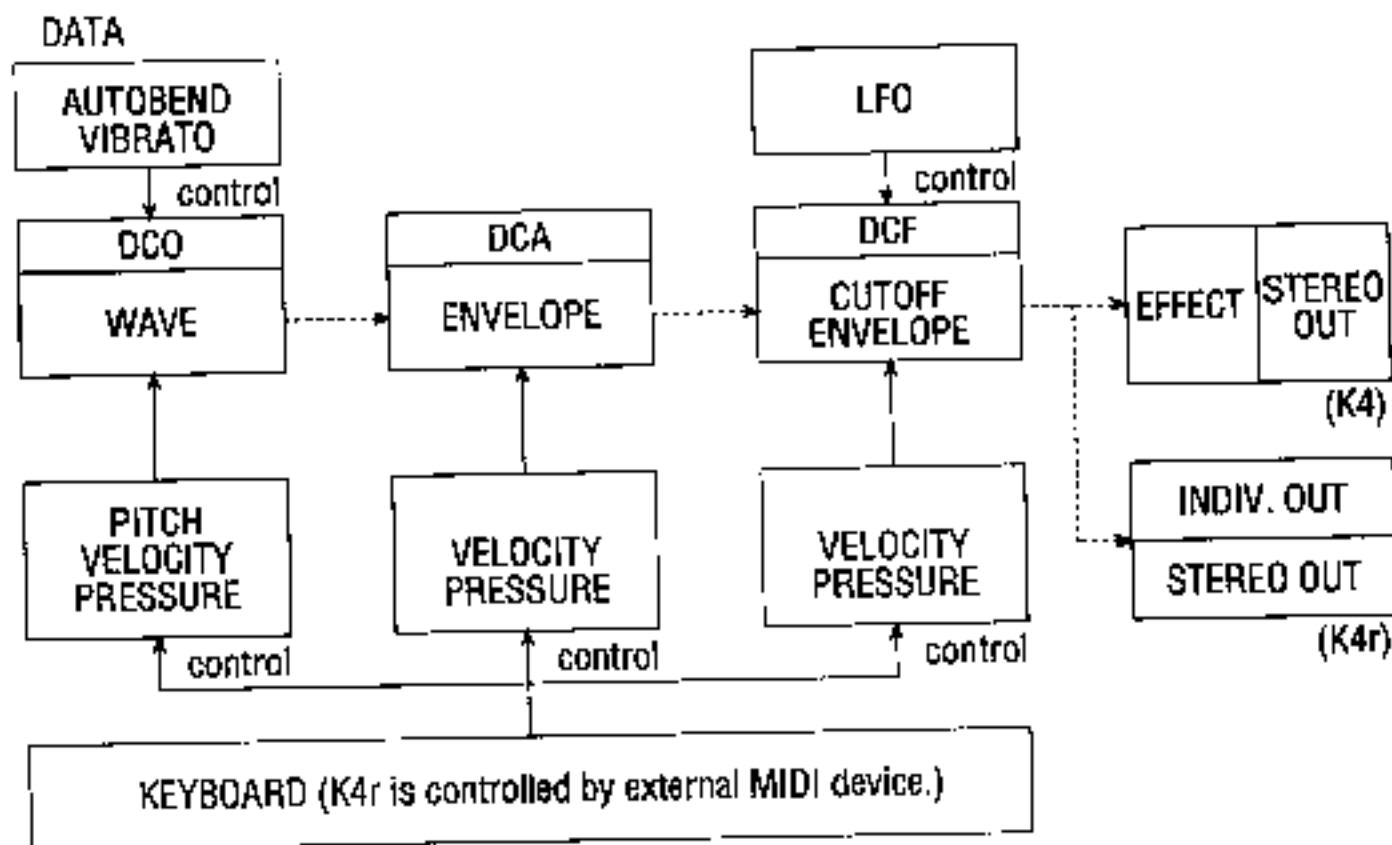
##### ● EFFECT (K4 only)

It is also possible to add a digital effect to the sounds produced by the synthesizer unit. Synthesized sounds often lack the warmth and ambience of acoustic instruments. It is therefore helpful to add a sense of spatial depth with effects such as Reverb, Chorus and Delay, or distort the sound with Overdrive, to give it a greater sense of realism.

##### ● INDIVIDUAL OUTPUT (K4r only)

In addition to the stereo left and right output jacks, the K4r has six individual Output jacks. In SINGLE PLAY mode, for example, by outputting the DRUM Section through the stereo jacks, the snare through Individual Output jack #1, the kick through jack #2, and the SINGLE Patch through jack #3, it is possible to process each sound differently through an external effects devices.





## ■ The K4/K4r Tone Generator

The K4/K4r produces sounds by a system known as DMS Tone Generation. Natural sounds exhibit complex variations in harmonic composition which are very difficult, if not impossible, to reproduce artificially using a single waveform, as would be the case with a conventional synthesizer. DMS Tone Generation makes sound creation easy by temporarily separating the sound into its component elements. It is comparatively easy to create even complex harmonic variations by combining these elements. The K4/K4r is capable of separating a tone into up to four such elements.

## ■ The K4/K4r's Internal Waveforms

By combining the characteristics of PCM and DC waveforms, the K4/K4r allows free creation of a wide variety of tones.

### ● PCM Waveforms

Conventional synthesizers were able to produce only waveforms such as triangle or sawtooth waves having comparatively simple harmonic configurations. They could not produce metallic sounds and other tones with complicated harmonic components. The K4/K4r has solved this problem by making use of PCM waveforms.

*Note: PCM, or Pulse Code Modulation, is a method of reproducing sounds such as those of acoustic instruments by converting them into a digital signal and recording them. The K4/K4r's internal PCM waveforms have a reproduction quality equal to that of a CD.*

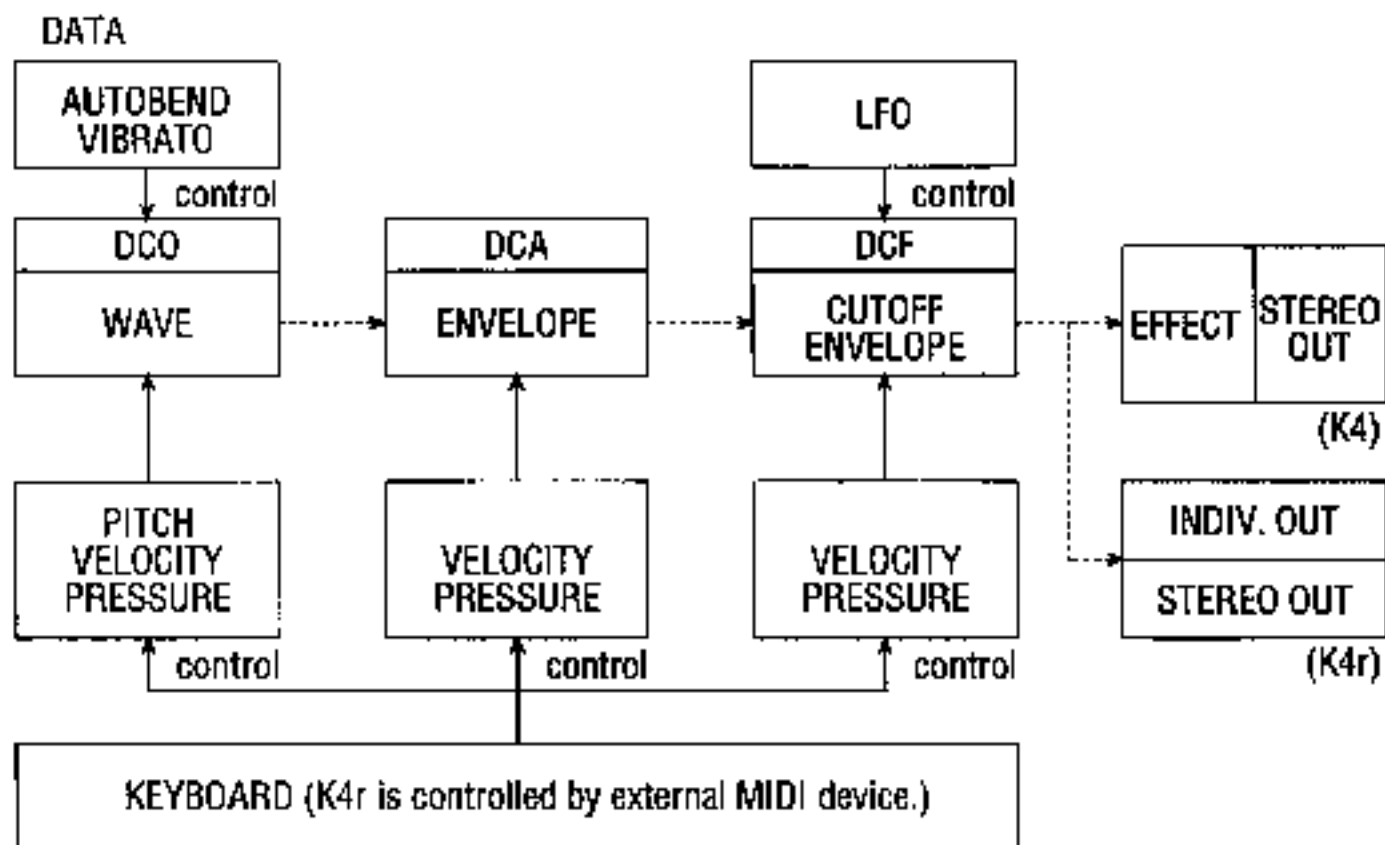
### ● DC (Digital Cyclic) Waveforms

DC waveforms consist of Cyclical PCM sounds which have been analyzed and recombined so that they are easy to process. It is useful to combine DC waveforms with PCM waveforms or with other DC waveforms for best results.

## ■ AM (Ring Modulation)

AM (Ring Modulation) is a system which combines two signals to create a single, more complex signal. One waveform is used to modulate or cause a change in the other, so unlike the DCF, which reduces harmonics, this system can produce new harmonics which were not included in either original waveform, allowing the creation of metallic, distorted or otherwise forceful sounds.

*Note: Keep in mind that it is important to give careful consideration to the extent of level modulation when using AM. (See P. 35)*



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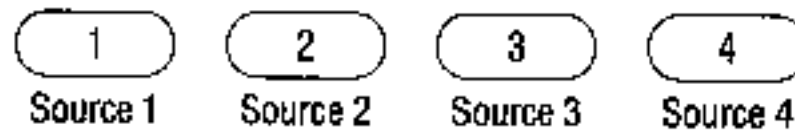
*Note: Keep in mind that it is important to give careful consideration to the extent of level modulation when using AM. (See P. 35)*

## ■ Choosing a Source to Edit

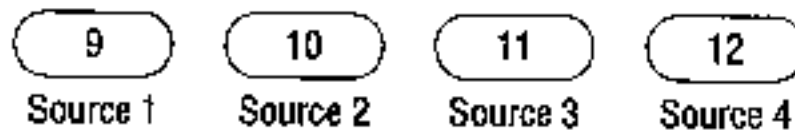
Each Source must be set individually for SINGLE Patches.

### <Procedure>

- (1) Select the Source to be edited using the Source Select switches 1, 2, 3, or 4.



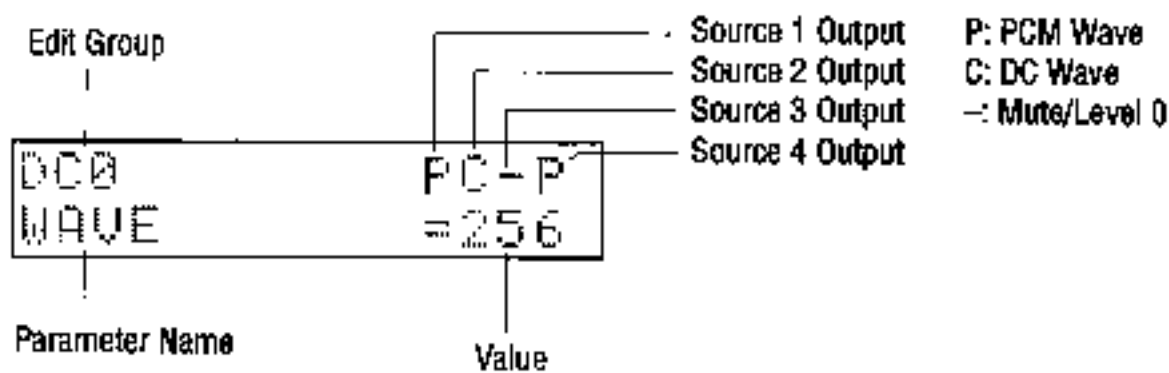
- (2) To listen to a Source's sound individually, use the Source Mute switches 9, 10, 11, and 12 to mute the other Sources temporarily.



- (3) When editing filter parameters, select the desired Filter using the Source Select switches 1, 2 (for Filter 1) and 3, 4 (for Filter 2) as below:



## ■ Display During Editing



## 2. SINGLE Patch Parameters

### ■ EDIT Group

```
SIA-1 C.Grand
VOLUME =100
```

### ● VOLUME

(Value: 0-100)

This controls the volume of all SINGLE Patches. The differences in volume between patches are adjusted so as to avoid any unnaturalness when switching between patches.

```
SIA-1 C.Grand
EFFECT PACH= 32
(OUTPUT)
```

### ● EFFECT (K4)/OUTPUT (K4r)

(Value: 1-32)

This allows selection from among the 32 EFFECT (K4)/OUTPUT (K4r) Settings made previously. (See P. 24, 71)

```
SIA-1 ABCDEFGHIJ
SUBMIX CH = H
```

### ● SUBMIX CH

(Value: A-H)

**K4**

A single EFFECT contains eight different SUBMIX CH settings that determined the level of EFFECT and sound image orientation. This allows you to select which SUBMIX CH to use. (See P. 24, 71)

**K4r**

The K4r has stereo L, R and six Individual Output jacks. A single OUTPUT contains eight different SUBMIX CH settings that determine the panning through the stereo outputs or assignment to the individual output jacks. This allows you to select which SUBMIX CH to use. (See P. 24, 71)

*Note: The K4r does not have EFFECT Settings.*

```
SIA-1 ABCDEFGHIJ
NAME 1st = A
```

### ● NAME 1st-10th

Edited patches are given names consisting of ten characters.

**Notes:** Move the cursor with the **EDIT** and **PREV** then select a number or letter with the VALUE Slider, **+ YES** and **- NO**.

*The following list gives the characters which may be used for a patch name.*

Valid name characters

```
■ !, ", #, $, %, &, ', (, ), *, +, ,, -, ., /
0, 1, 2, 3, 4, 5, 6, 7, 8, 9
:, ;, <, =, >, ?, @
A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z
[, \, |, ^, -, `
a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z
{, |, }, →, ←
```

## ■ COMMON Group

These are set to act on all Sources of a SINGLE Patch.

- Source mode
- AM 1 → 2
- AM 3 → 4
- POLY mode
- Pressure → Freq.
- Wheel Assign
- Wheel Depth
- AUTO BEND Time
- AUTO BEND Depth
- AUTO BEND KS (Keyboard Scaling)
- AUTO BEND Velocity

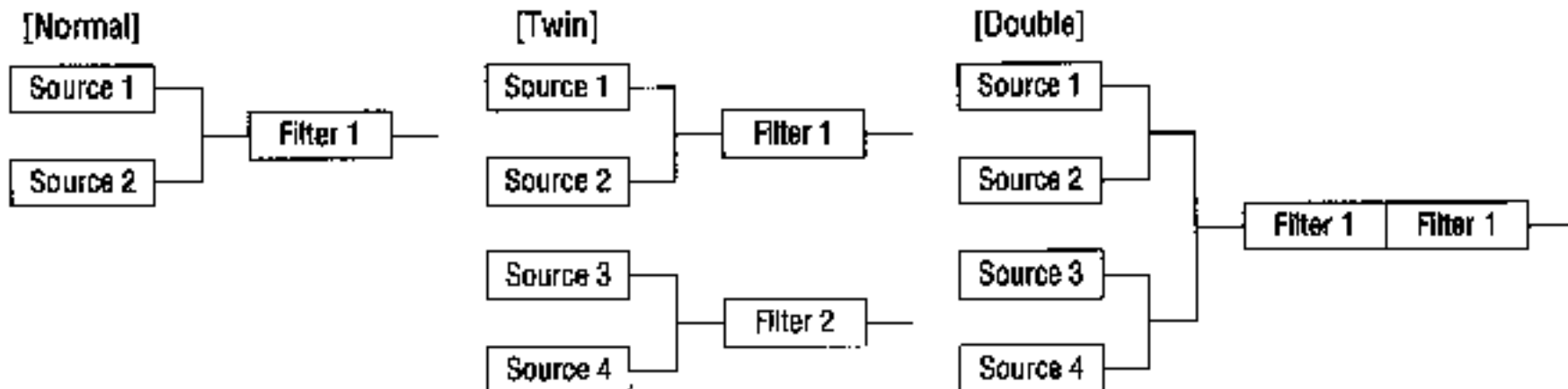
### ● Source mode

(Value: NORM, TWIN, DBL)

Combinations of DCO and DCA are called "Sources." With the K4/K4r, four Sources may be combined to create a tone.

```
COMMON      PCCP
SOURCE MODE=DBL
```

This sets the Source combination and how the Filter will be used with the Source.



**Note:** Choosing "TWIN" or "DBL" makes the K4/K4r an 8-voice polyphonic instrument – that is, limited to sounding a maximum of 8 notes at a time.

```
COMMON      PCCP
AM 1>2      =ON
```

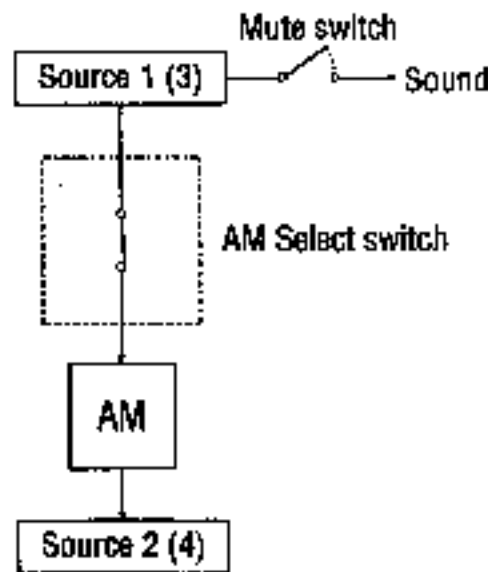
(3>4)

● **AM (Ring Modulation)**

(Value: ON,OFF)

This sets whether the Ring Modulation wave type is to be used with Source 1 (3). When this value is ON, wave 1 (3) is used to distort wave 2 (4).

*Note: When AM is in use, Source Mute is enabled. A setting may be made as to whether to output or mute the modulating sound. (See P. 32)*



● **POLY mode**

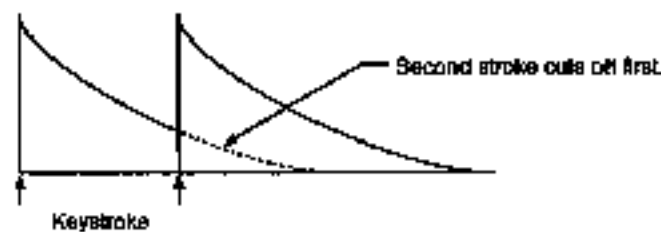
(Value: PLY1, PLY2, SOL1, SOL2)

Sets the way the SINGLE Patch is to sound.

```
COMMON
POLY MODE  =PLY1
```

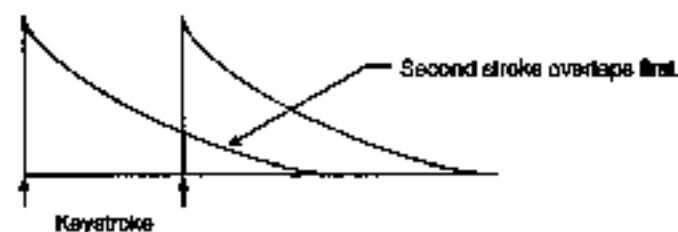
● **PLY1 (Poly 1)**

This mode cuts off the previous note each time the same note is struck.



● **PLY2 (Poly 2)**

This mode allows the previous note to sound each time the key is struck. When the number of tones which may be created at one time is exceeded, the tone of the next key pressed will take priority.



• **SOL1 (Solo 1)**

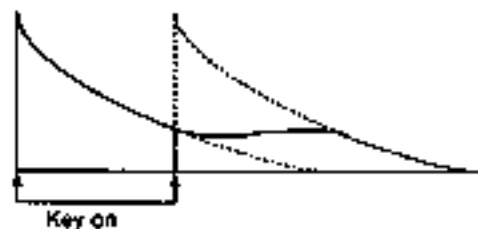
This is used to produce only monophonic sound without harmony.

*Note: When one key is held down and another key pressed, when the second key pressed is released, the tone produced by the first key will still be made.*

With a SINGLE Patch, because the K4/K4r can be used as a monophonic synthesizer, it is outstanding as a fat lead synthesizer for rock music. When a key is pressed down and held and the next key pressed, after the second key is released, the sound of the first key remains. This works well with fast passages.

• **SOL2 (Solo 2)**

Also known as "legato mode", this is basically the same in principle as SOL1 above, but when a second or further keys are pressed while a first is being held down, there is no attack phase for those following the first. This is good for producing real tone variation, such as for a distorted lead guitar or solo violin.



● **BENDER RANGE**

(Value: 0-12)

COMMON            PCCP  
BNDR RANGE = 12

This sets the amount of pitch variation when using Pitch Bend. The range is from a semitone to a maximum of one octave variation.

● **PRESS FREQ**

(Value: -50 to 0 to +50)

COMMON            PCCP  
PRESS > FREQ = -50

Sets the level of Aftertouch (the effect of pressing a key even harder once again after having pressed and held it down). When this is a negative value, this decreases with the increase in pressure applied to the key.

The type and level of effect of Aftertouch varies with the tone setting.

● **WHEEL ASSIGN**

(Value: VIB, LFO, DCF)

Sets the type of effect that will take place when the Modulation Wheel has been used.

WHEEL ASSIGN	PCCP =VIB
-----------------	--------------

VIB → causes the Vibrato Effect.  
LFO → causes the Wah wah Effect.  
DCF → adjusts Filter Cutoff

● **WHEEL DEPTH**

(Value: -50 to 0 to +50)

Adjusts the level of effect when the Modulation Wheel has been used. When this is a positive value, the effect increases with the increase in the amount of use of the Wheel.

WHEEL DEPTH	PCCP =-50
----------------	--------------

■ **AUTO BEND**

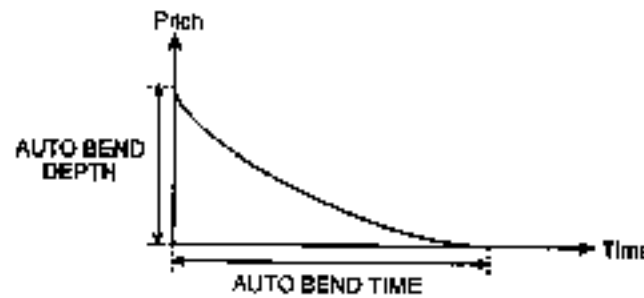
Pitch Bend can be set to go into effect automatically upon the strike of a key. When the set value is made small, the pitch changes of sounds characteristic to ethnic and lead instruments can be reproduced. When the value is made large, effects such as tabla and electric tom can be created.

● **TIME**

(Value: 0-100)

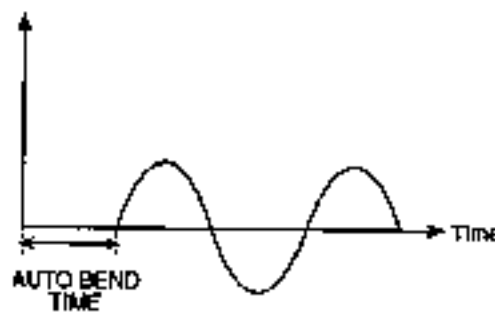
Sets the Auto Bend time duration.

AUTO BEND TIME	PCCP =100
-------------------	--------------



Value	Effect
0	No effect
↓	↓
100	Medium period

Sets the amount of time before Vibrato takes effect after a key is pressed.

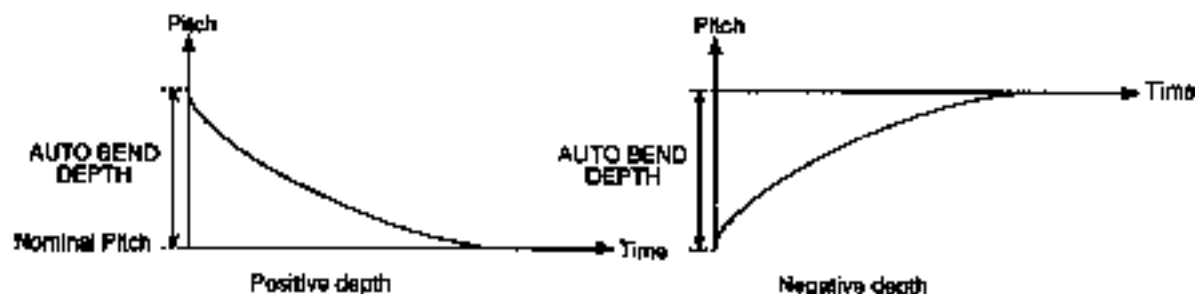


● DEPTH

(Value: -50 to 0 to +50)

Sets the pitch variation amplitude for Auto Bend.

```
AUTO BEND PCCP
DEPTH      =-50
```



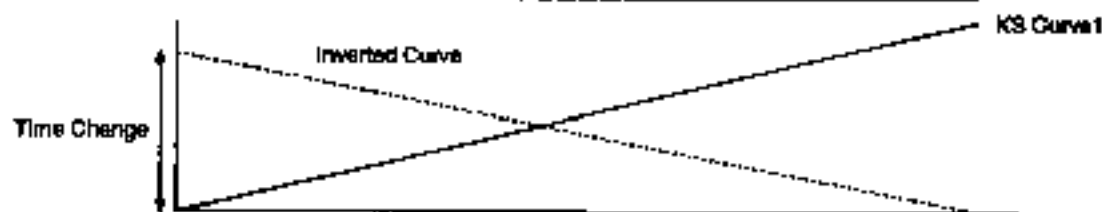
Value	Effect
+50	Pitch drops to nominal value
§	§
0	No effect
§	§
-50	Pitch rises to nominal value

● KS TIME

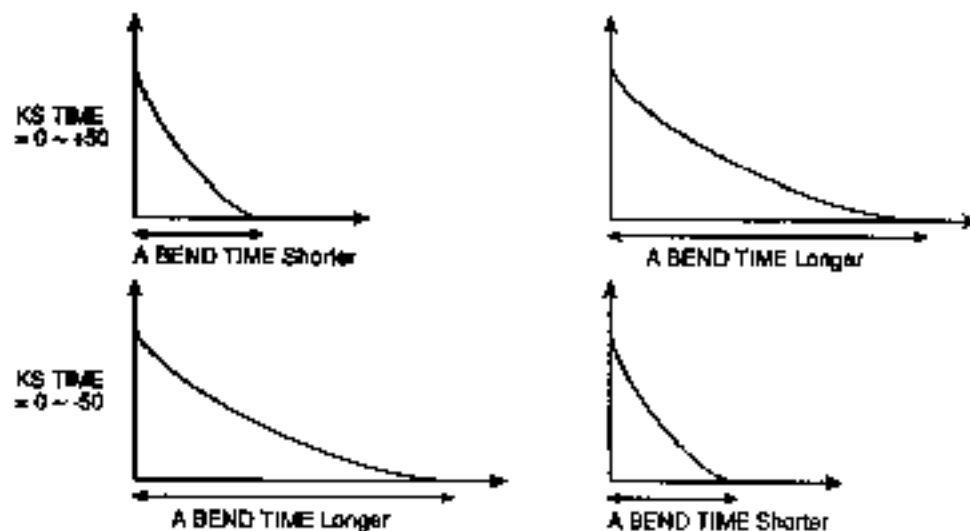
(Value: -50 to 0 to +50)

The Auto Bend time duration can vary with the location on the keyboard. This variation is determined by the KS Curve. (See P. 45)

```
AUTO BEND PCCP
KS>TIME   =-50
```



Value	Effect
+50	Maximum effect with normal KS curve
§	§
0	No effect
§	§
-50	Maximum effect with inverted KS curve

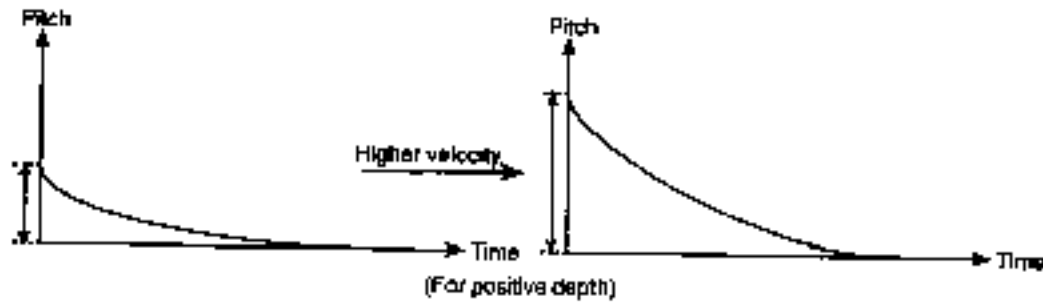


● **VEL DEPTH**

(Value: -50 to 0 to +50)

Auto Bend pitch depth of change can be varied depending on the amount of velocity while playing.

```
AUTO BEND   PCCP  
VEL>DEPTH  =-50
```



Value	Effect
+50	Depth increases with velocity
∫	∫
0	No effect
∫	∫
-50	Depth decreases with velocity

## ■ LFO GROUP

Vibrato may be obtained by adding LFO to the DCO, and a Wah wah effect by adding LFO to DCF.

- VIBRATO Shape
- VIBRATO Speed
- VIBRATO Depth
- VIBRATO Pressure Depth
- LFO Shape
- LFO Speed
- LFO Delay
- LFO Depth
- LFO Pressure Depth

### ■ VIBRATO

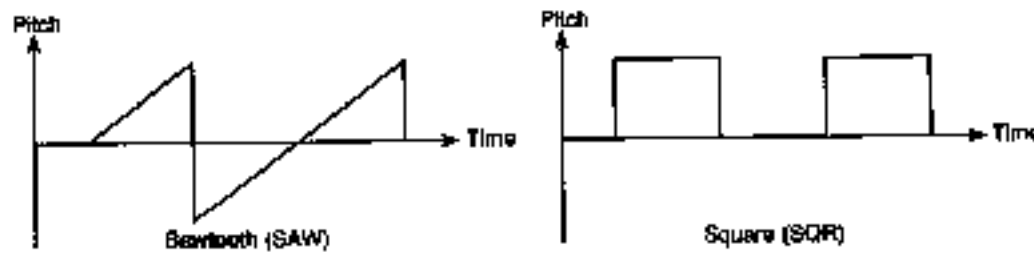
An Effect which creates oscillations in pitch.


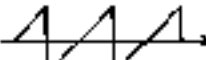
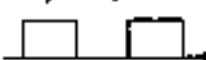
#### ● SHAPE

(Value: TRI, SAW, SQR, RND)

Sets how the pitch is to be shaped.

```
VIBRATO   PCCP
SHAPE     =TRI
```



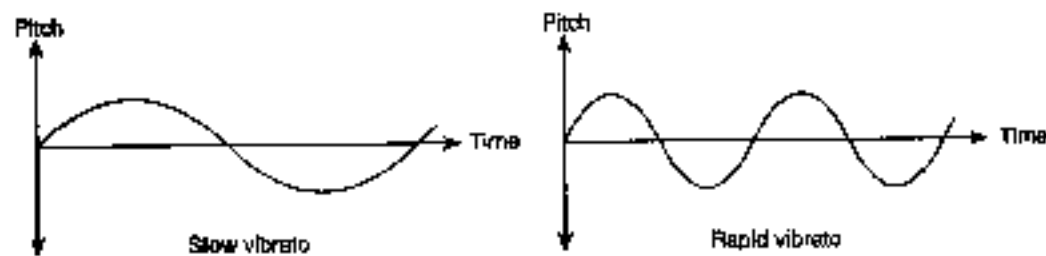
Value	Effect
TRI	 Triangle
SAW	 Sawtooth
SQR	 Square
RND	Random variation

```
VIBRATO   PCCP
SPEED     =100
```

#### ● SPEED

(Value: 0-100)

Sets Vibrato speed.



Value	Effect
0	Slow vibrato
5	}
100	

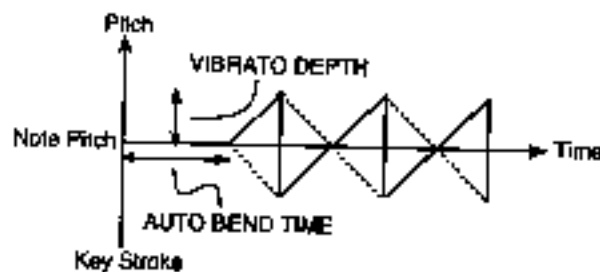
VIBRATO PCCP  
DEPTH = -50

● DEPTH

(Value: -50 to 0 to +50)

Sets the depth of change of Vibrato pitch variation. The Vibrato for each source may be turned ON and OFF with the DCO Group VIBRATO/AUTO BEND. (See P. 47)

The amount of time after a key is pressed until Vibrato takes effect can be set with COMMON Group AUTO BEND TIME. (See P. 37)



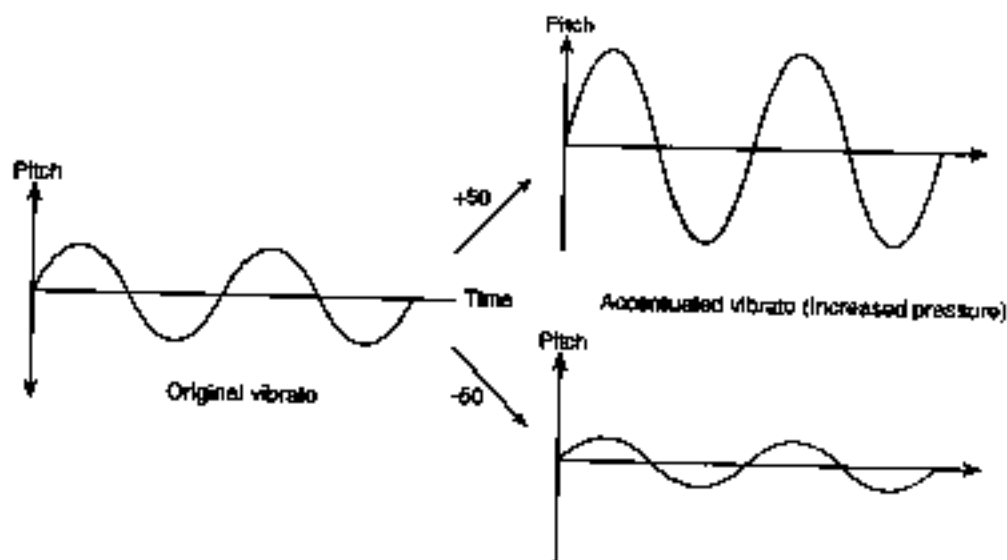
Value	Effect
+50	Maximum vibrato with normal waveform
5	5
0	No vibrato
5	5
-50	Maximum vibrato with inverted waveform

VIBRATO PCCP  
PRESS DEPTH = -50

● PRESS DEPTH

(Value: -50 to 0 to +50)

The depth of Vibrato pitch change may be adjusted by the amount of pressure placed on the key while playing.



Value	Effect
+50	Increased vibrato
5	5
0	No effect
5	5
-50	Decrease vibrato

■ LFO

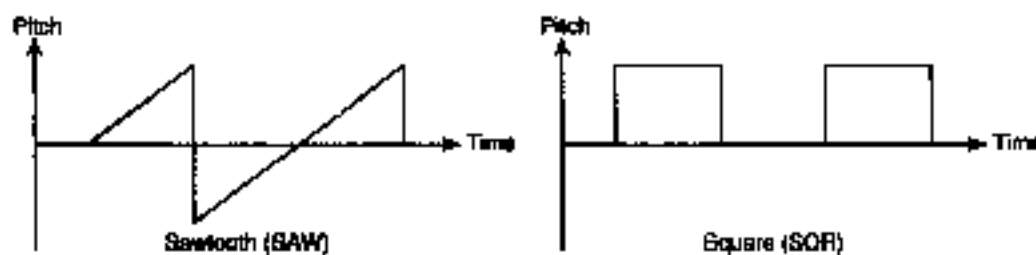
Varies tone according to the LFO cycle (for a LFO Modulation 'Wah wah')

● SHAPE

(Value: TRI, SAW, SQR, RND)

Sets how the pitch is to be shaped.

```
LFO      PCCP
SHAPE    =SAW
```



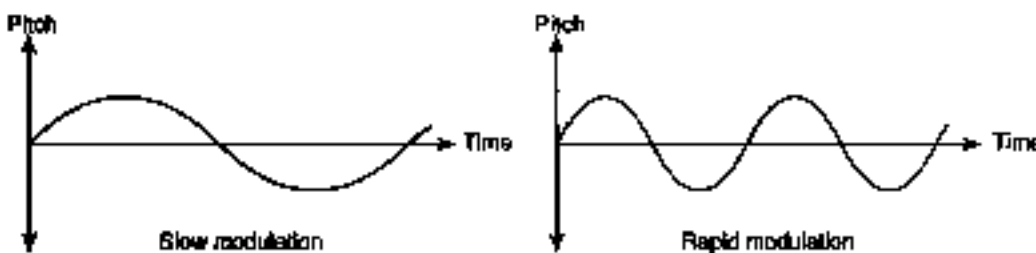
Value	Effect
TRI	Triangle
SAW	Sawtooth
SQR	Square
RND	Random variation

● SPEED

(Value 0-100)

Sets LFO Modulation speed.

```
LFO      PCCP
SPEED    =100
```



Value	Effect
0	Slow modulation
5	§
100	Rapid modulation

● DELAY

(Value- 0-100)

Sets the amount of time before LFO Modulation takes effect after a key has been pressed.

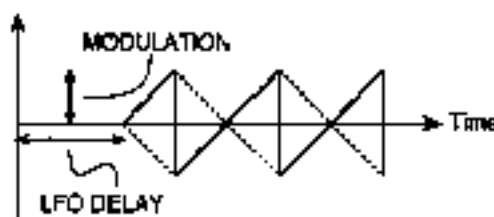
```
LFO      PCCP
DELAY    =100
```

● DEPTH

(Value: -50 to 0 to +50)

Sets the depth of change of the LFO Modulation tone.

```
LFO      PCCP
DEPTH    =-50
```



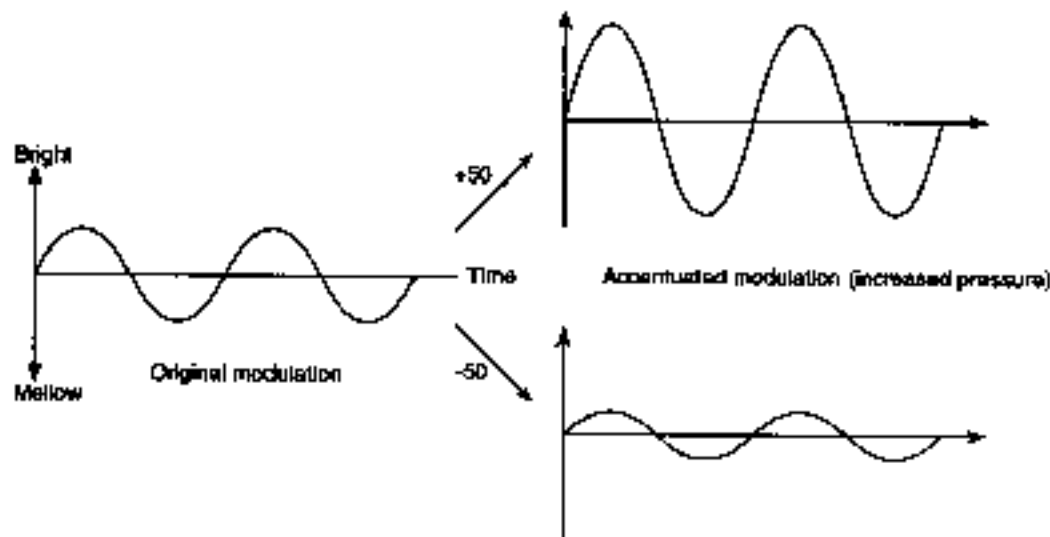
Value	Effect
+50	Maximum modulation with normal waveform
5	§
0	No modulation
5	§
-50	Maximum modulation with inverted waveform

```
LFO          PCCP
PRESS DEPTH=-50
```

● **PRESS DEPTH**

(Value: -50 to 0 to +50)

Depth of LFO Modulation tone change may be adjusted depending upon the amount of pressure placed on the key when playing.



Value	Effect
+50	Increased modulation
§	§
0	No effect
§	§
-50	Decrease modulation

■ **SOURCE COMMON (S-COMMON) Group**

This sets the following parameters for each Source:

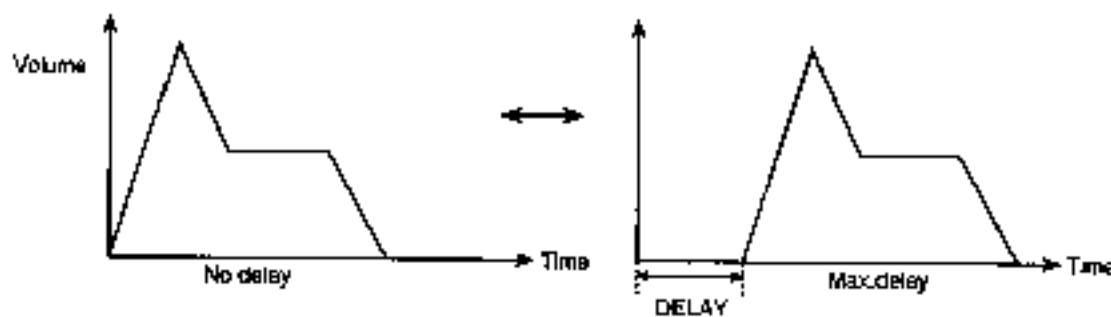
- DELAY
- VEL CURVE
- KS CURVE

● **DELAY**

(Value: 0 to 100)

```
S.COMMON    PCCP
DELAY       =100
```

This sets the time for each source from the point the key is struck to the point when attack begins.



Value	Effect
0	0
§	§
100	Max. delay

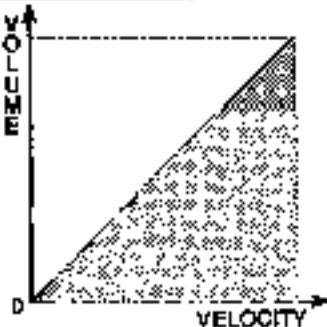
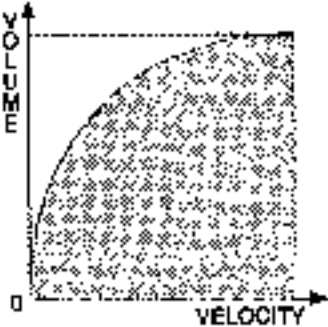
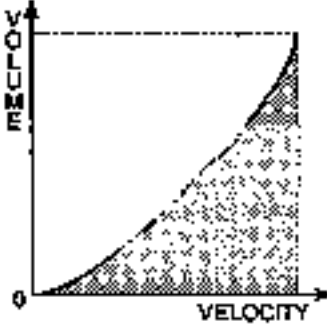
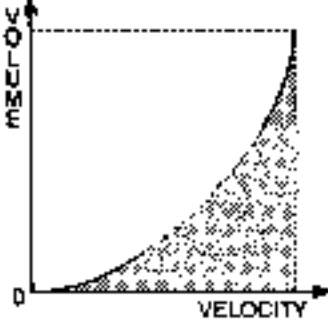
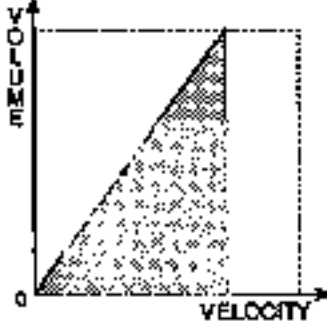
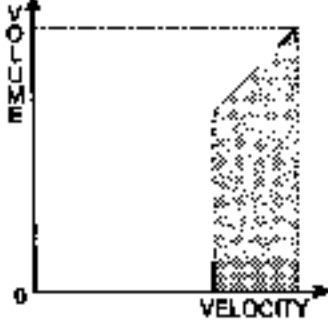
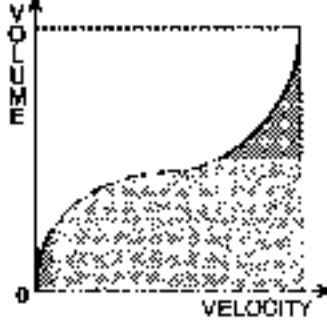
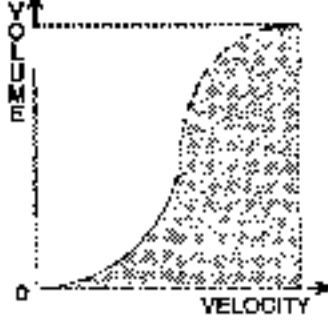
## ■ VEL (Velocity Curve) Chart

### ● VEL (Velocity) CURVE

(Value: 1 to 8)

You can select the way in which volume and tone are changed by how hard the key is struck, choosing from the following eight curves.

S. COMMON = PCOP  
VEL CURVE = 8

VEL CURVE DIAGRAM	
<b>1</b>	 <p>This is an easy-to-use, orthodox curve. Volume rises linearly with key velocity.</p>
<b>2</b>	 <p>With this curve, the volume rises rapidly with a light touch.</p>
<b>3</b>	 <p>This curve rises from low to high volume exponentially, making it suitable for deeply emotive tones.</p>
<b>4</b>	 <p>This curve is somewhat deeper than curve 3.</p>
<b>5</b>	 <p>This can be used as a SINGLE Velocity switch when combined with curve 6. No sound is played if the key is struck with force.</p>
<b>6</b>	 <p>This can be used as a SINGLE Velocity switch when combined with curve 5. Sound is played only if the key is struck with force.</p>
<b>7</b>	 <p>With this curve, volume rises sharply at first, maintains a medium level, then sharply increases at maximum force.</p>
<b>8</b>	 <p>This curve stays low throughout much of the velocity range. It makes possible quiet, subtly expressive tones, and is appropriate for piano sounds.</p>

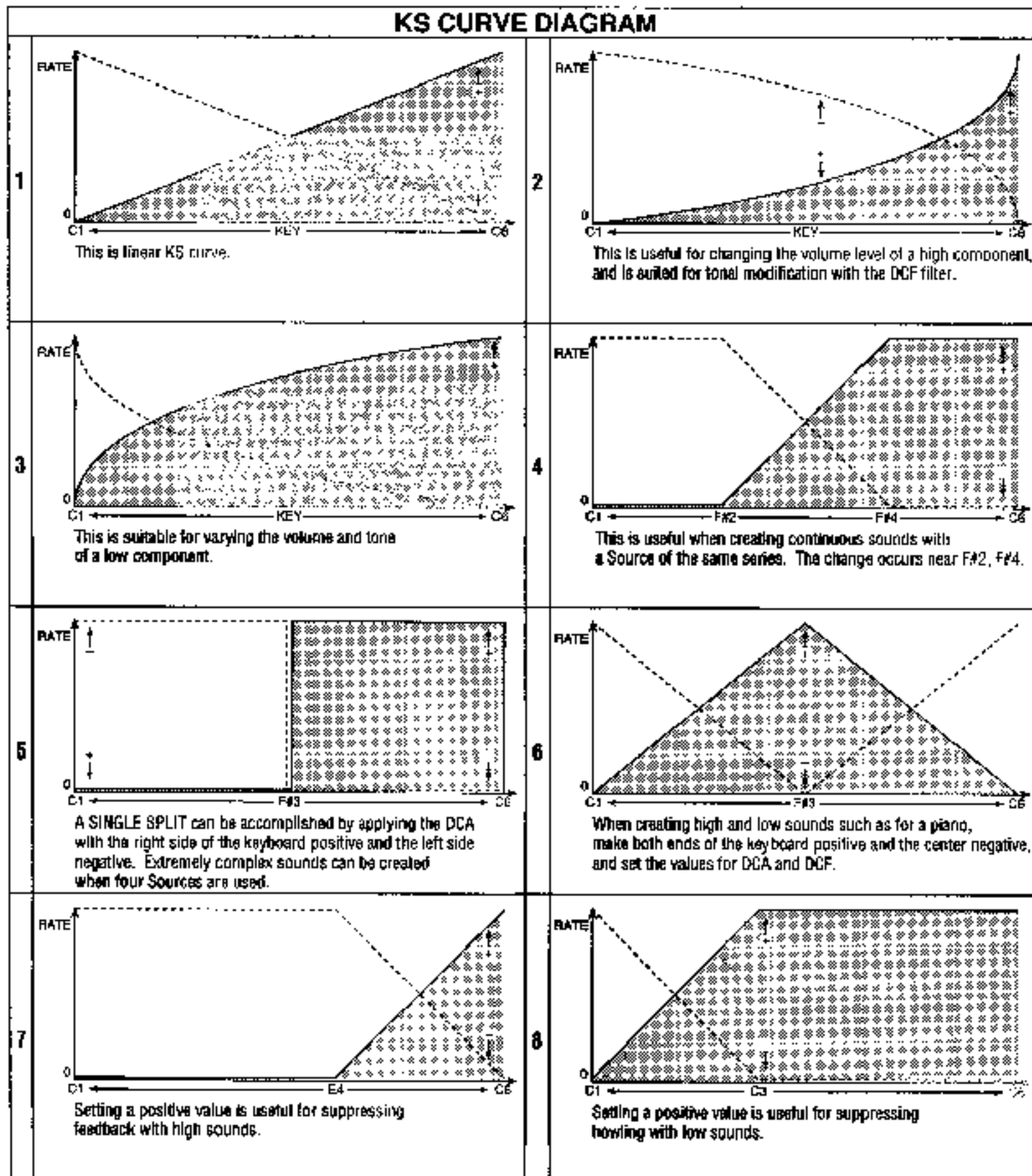
## ■ KS (Keyboard Scaling) Chart

### ● KS (Keyboard Scaling) CURVE (Value: 1 to 8)

S. COMMON      E00CF  
KS CURVE      ==    8

This changes tone and volume according to the position of the key that is struck. You can select how these changes are made from the following eight curves.

See "Editing Capabilities" on P. 57 for an explanation of how to copy.



## ■ DCO Group

The DCO sets the values for waveform and pitch.

- WAVE
- KEY TRACK
- COARSE
- FINE
- FIXED KEY
- PRESSURE → Freq.
- VIBRATO/AUTO BEND

### ● WAVE

(Value: 1 to 96 (C), 97 to 256 (P))

This selects the desired waveform for each Source from the 256 waveforms available.

DCO	PCCP
WAVE	=256

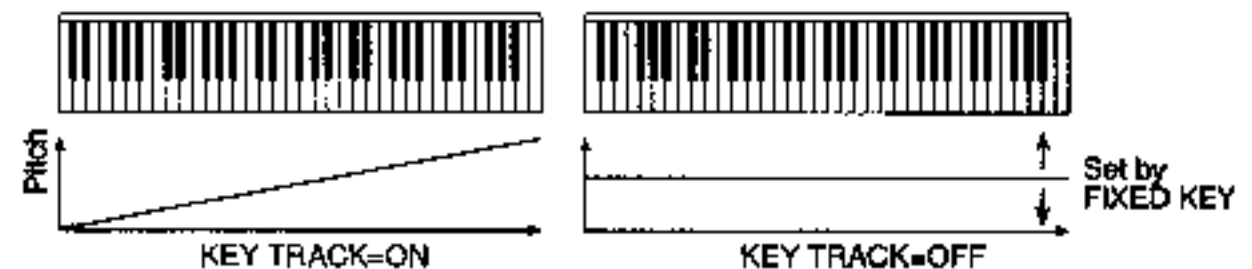
*See the WAVE LIST packed with the unit for available waveforms.*

### ● KEY TRACK

(Value: ON or OFF)

This selects whether pitch is to change depending on the key struck. The keys scale normally when ON, but will be fixed at the pitch specified by FIXED KEY when OFF. (See P. 47)

DCO	PCCP
KEY TRACK	=ON



### ● COARSE

(Value: -24 to 0 to +24)

This sets the pitch of each Source in half steps. You can make settings within a range of two octaves up or down.

DCO	PCCP
COARSE	=-24

### ● FINE

(Value: -50 to 0 to +50)

Fine tune the pitch of the Sources.

DCO	PCCP
FINE	=-50

DCO PCCP  
FIXED KEY =C -1

● **FIXED KEY**

(Value: C-1 to G8)

Fix the pitch of each Source to a particular pitch.

*Note: This setting can only be made when KEY TRACK is OFF. (See P. 46)*

DCO PCCP  
PRESS =ON

● **PRESSURE FREQUENCY**

(Value: ON or OFF)

This selects whether Aftertouch will affect the pitch.

*Note: This is handy for violin, sax or other solo series tones.*

DCO PCCP  
VIB/A.BEND =ON

● **VIBRATO/AUTO BEND**

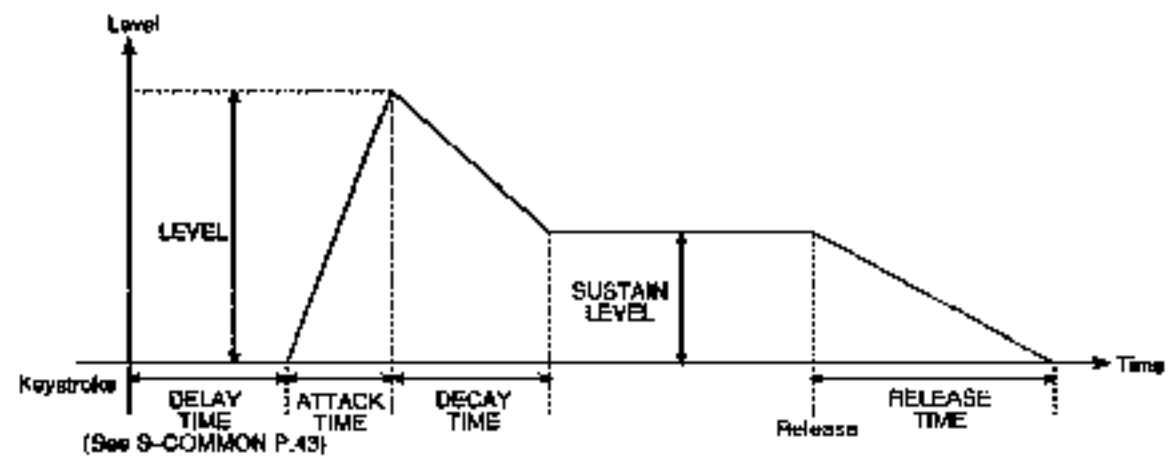
(Value: ON or OFF)

This selects whether Vibrato and Auto Bend will affect the pitch. (See P. 40)

## ■ DCA Group

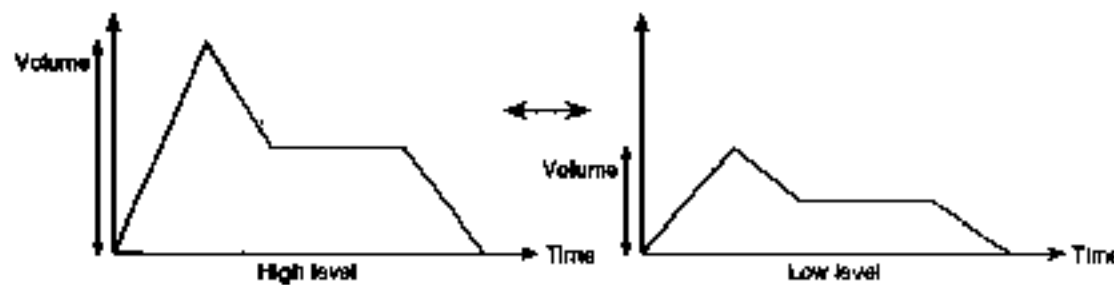
The DCA sets the values for volume of a sound over time.

- LEVEL
- ATTACK
- DECAY
- SUSTAIN
- RELEASE



```
DCA          PCCP
LEVEL        =100
```

- LEVEL  
(Value: 0 to 100)  
This adjusts the initial level for each Source.



Value	Effect
0	No output (mute)
5	5
100	Maximum level

```
DCA          PCCP
ATTACK       =100
```

- ATTACK  
(Value: 0 to 100)  
This sets the time from the start of the sound until peak volume is reached (for each Source).

```
DCA          PCCP
DECAY        =100
```

- DECAY  
(Value: 0 to 100)  
This sets the time from peak volume to the sustain level (for each source).

```
DCA          PCCP
SUSTAIN      =100
```

- SUSTAIN  
(Value: 0 to 100)  
This sets the stable level which will be maintained as long as the key is held down (for each Source).

```
DCA
RELEASE = 100
```

● **RELEASE**

(Value: 0 to 100)

This sets the time from the point when the key is released until the sound disappears (for each Source).

■ **DCA MODULATION (DCA MOD) Group**

The DCA MOD is used to modulate the level with the keys.

- VEL DEPTH
- PRESSURE DEPTH
- KS DEPTH
- TIME MODULATION VELOCITY
- TIME MODULATION RELEASE VELOCITY
- TIME MODULATION KS

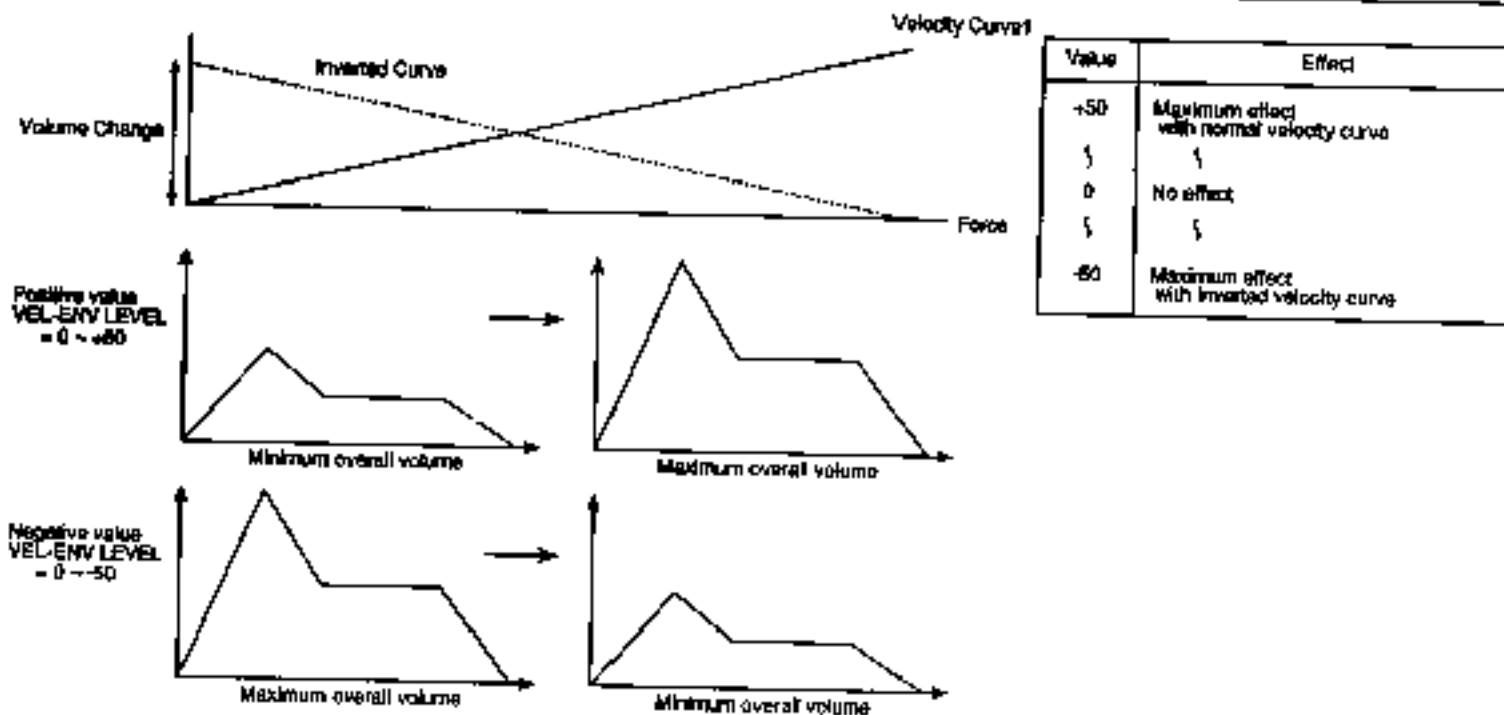
● **VEL (Velocity) DEPTH**

(Value: -50 to 0 to +50)

This adjusts the amount of change in volume by how hard the key is struck (for each Source). Setting a negative value makes the sound quieter the harder you hit the key.

```
DCA MOD
VEL DEPTH = -50
```

*Note: This sets the change according to the S-COMMON Velocity Curve. (See P. 44)*



● **PRESSURE DEPTH**

(Value: -50 to 0 to +50)

This adjusts the volume according to how hard the key is pressed (for each Source). Setting a negative value makes the sound quieter the harder you press the key.

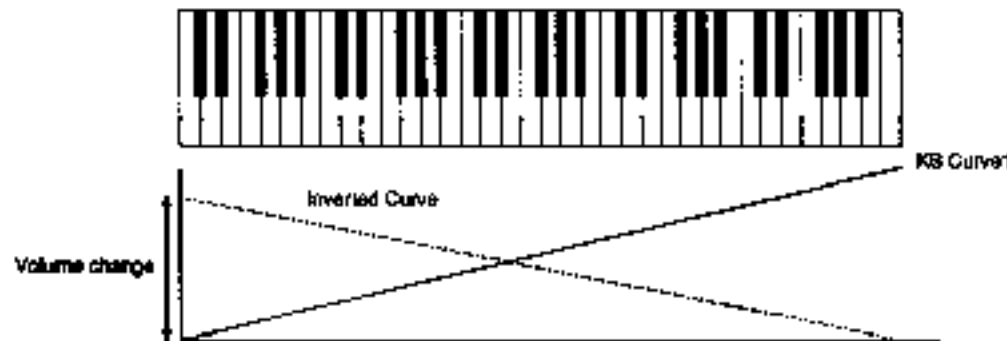
```
DCA MOD
PRESS DEPTH = -50
```

● **KS (Keyboard Scaling) DEPTH**

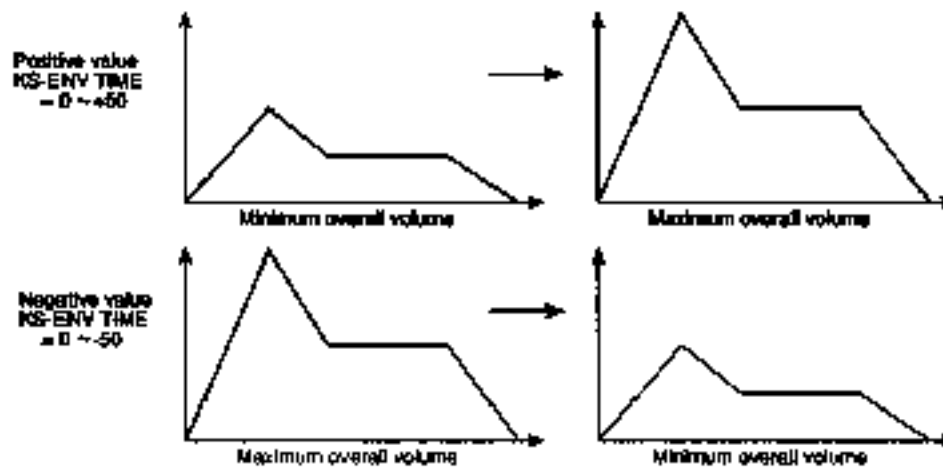
(Value: -50 to 0 to +50)

PCOP  
=-50

This changes the volume level according to the position of the struck key (for each Source). Setting a positive value increases the volume according to the KS Curve set with S-COMMON, while a negative value will decrease the volume according to the inverse of the KS Curve. (See P. 45)



Value	Effect
+50	Maximum effect with normal KS curve
0	No effect
-50	Maximum effect with inverted KS curve

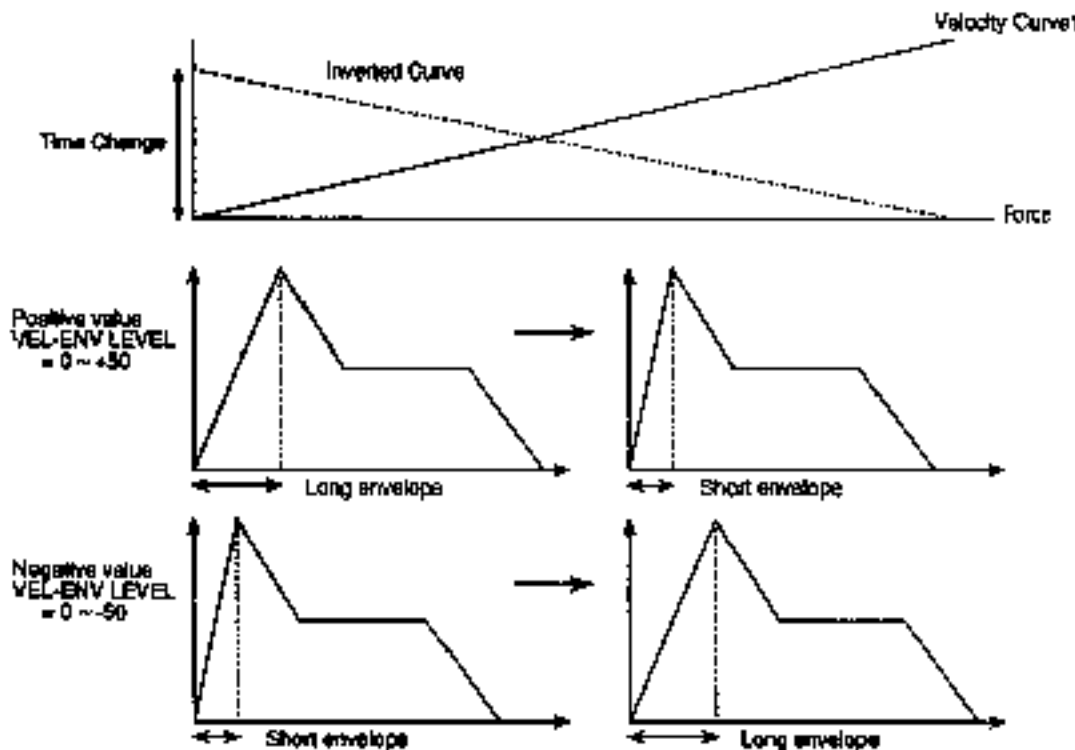


● **TIME MODULATION VELOCITY (VEL)**

(Value: -50 to 0 to +50)

TIME MOD  
VEL = PCOP  
=-50

This controls the envelope time according to how hard the key is struck (for each Source). Setting a positive value changes the attack according to the Velocity Curve set with S-COMMON, while a negative value will change the attack according to the inverse of the Velocity Curve. (See P. 44)



Value	Effect
+50	Maximum effect with normal velocity curve
0	No effect
-50	Maximum effect with inverted velocity curve

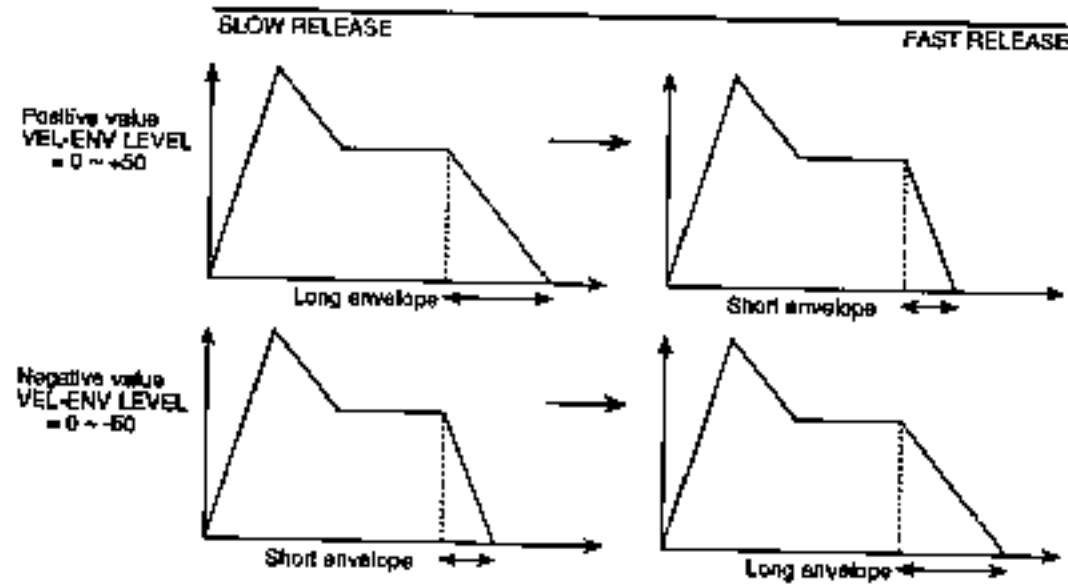
```

TIME MOD      PCCP
RELEASE VEL=-50
  
```

● **TIME MODULATION RELEASE VELOCITY**

(Value: -50 to 0 to +50)

This adjusts the release time according to how hard the key is struck (for each Source).



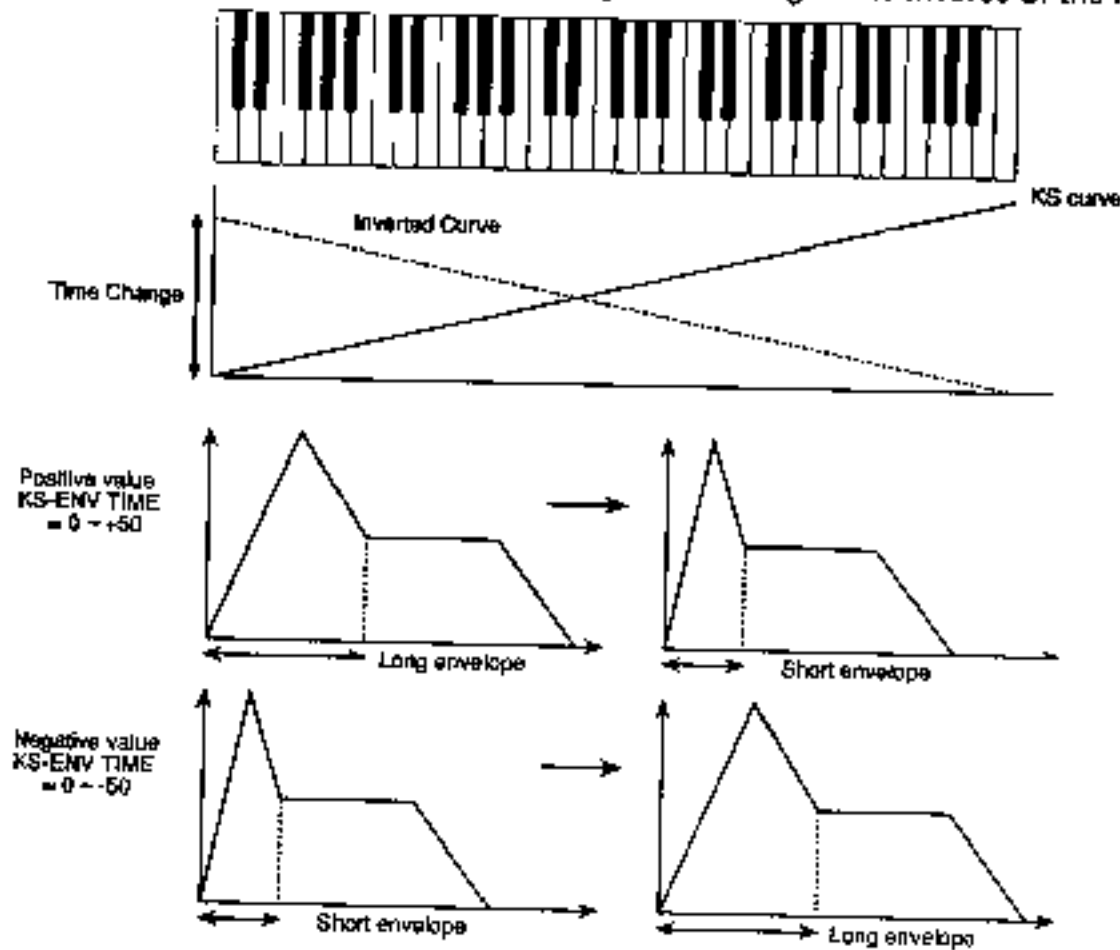
```

TIME MOD      PCCP
KS              =-50
  
```

● **TIME MODULATION KS**

(Value: -50 to 0 to +50)

This changes the attack and decay times of the envelope according to the position of the key struck (for each Source). Setting a positive value makes these changes according to the KS Curve set with S-COMMON, while a negative value will make changes according to the inverse of the KS Curve. (See P. 45)



Value	Effect
+50	Maximum effect with normal KS curve
§	§
0	No effect
§	§
-50	Maximum effect with inverted KS curve

## ■ DCF Group

The DCF sets the values for the tone filter.

- CUTOFF
- RESONANCE
- VELOCITY DEPTH
- PRESSURE DEPTH
- KS DEPTH
- LFO

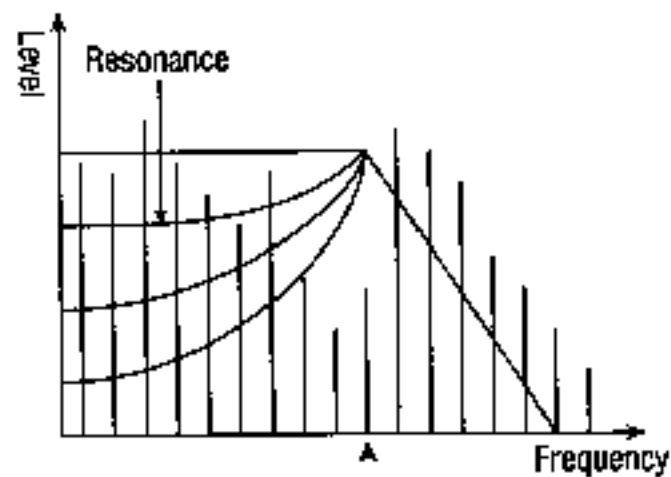
**Note:** When in the TWIN Source mode, select the Filter by pressing a Source Select (1 to 4). You can select the Filters for Sources 1 and 2 with switches 1 and 2, and the Filters for Sources 3 and 4 with switches 3 and 4.

### ● CUTOFF

(Value: 0 to 100)

The basic function is the same as an analog Low Pass Filter. A tone generator waveform containing many harmonics is adjusted by a Low Pass Filter, which cuts off all harmonics above a specified Cutoff value. The higher this value is, the more brilliant the sound.

```
DCF          = F00F
CUTOFF      = 100
```



CUTOFF POINT  
(Harmonics with frequencies higher than this value are Cutoff.)

**Note:** No sound will be heard if you set this value too low.

● **RESONANCE**

(Value: 0 to 7)

This sets the level near the Cutoff Frequency. The larger you set this value, the more emphasis is given to the particular frequency, resulting in a sharp, ringing tone.

*Note: Especially sharp timbres can be created in the DOUBLE Source mode. The tone will be distorted if you set this value too high.*

● **VELOCITY DEPTH (VEL DEPTH)**

(Value: -50 to 0 to +50)

This adjusts the amount Velocity Modulation of the filter Cutoff Frequency. Setting a positive value makes the sound brighter the harder the key is struck. Setting a negative value makes the sound less brilliant the harder the key is struck. (See P. 44)

● **PRESSURE DEPTH**

(Value: -50 to 0 to +50)

This adjusts the Cutoff according to how hard the key is pressed. Setting a positive value makes the sound brighter the harder you press the key. Setting a negative value makes the sound less brilliant the harder you press the key.

● **KS DEPTH**

(Value: -50 to 0 to +50)

This changes the Cutoff according to the position of the struck key. Setting a positive value changes the tone according to the KS Curve set with S-COMMON, while a negative value will change the tone according to the inverse of the KS Curve. (See P. 45)

*Note: For NORMAL and DOUBLE this is according to the KS Curve selected for Source 1, and for TWIN this is according to the KS Curve selected for Sources 1 and 3.*

● **LFO**

(Value: ON or OFF)

This selects whether the Cutoff Frequency will be modulated by the LFO. The speed of tone oscillation is set with the LFO. (See P. 40)

```
DCF          PCCP
RESONANCE   = 7
```

```
DCF          PCCP
VEL DEPTH   = -50
```

```
DCF          PCCP
PRESS DEPTH = -50
```

```
DCF          PCCP
KS DEPTH    = -50
```

```
DCF          PCCP
LFO         = ON
```

## ■ DCF MODULATION (DCF MOD) Group

These settings are used when changing the tone with an envelope (temporal change). The Cutoff Point set for DCF is taken as a standard (Level 0) for making changes in level over time.

- ENVELOPE DEPTH
- VELOCITY DEPTH
- ATTACK
- DECAY
- SUSTAIN
- RELEASE
- TIME MODULATION VELOCITY
- TIME MODULATION RELEASE VELOCITY
- TIME MODULATION KS

When in the TWIN Source mode, select the Filter by pressing a Source Select (1 to 4) in the same way as you did for editing with the DCF. You can select the Filters for Sources 1 and 2 with switches 1 and 2, and the Filters for Sources 3 and 4 with switches 3 and 4.

**Note:** For NORMAL and DOUBLE this is according to the Delay, Velocity Curve and KS Curve selected for Source 1, and for TWIN this is according to the Delay, Velocity Curve and KS Curve selected for Sources 1 and 3.

### ● ENVELOPE DEPTH

(Value: -50 to 0 to +50)

This sets the amount of Cutoff Modulation by the DCF's envelope. Setting a positive value raises the Cutoff Frequency as the level of the envelope curve becomes higher, for a brighter sound. Setting a negative value lowers the Cutoff Frequency as the level of the envelope curve becomes higher, for a less brilliant tone.

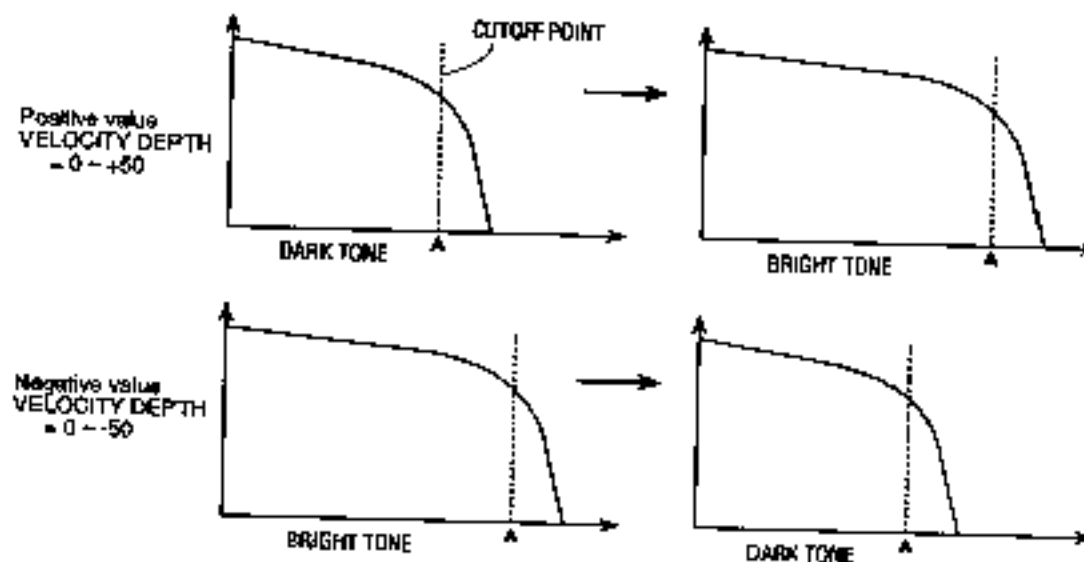
DCF MOD	PCCF
ENU DEPTH	= -50

DCF MOD	PCCP
VEL DEPTH	= -50

● **VELOCITY DEPTH (VEL DEPTH)**

(Value: -50 to 0 to +50)

This controls the envelope level according to how hard the key is struck. The change is according to the Velocity Curve set for S-COMMON. (See P. 44)



● **ATTACK**

(Value: 0 to 100)

This sets the speed of the envelope attack. The larger the value, the slower the tone will change.

DCF MOD	PCCP
ATTACK	= 100

● **DECAY**

(Value: 0 to 100)

This sets the time until the attack level drops to a sustained Cutoff Frequency level.

DCF MOD	PCCP
DECAY	= 100

● **SUSTAIN**

(Value: 0 to 100)

This sets the Cutoff Frequency level which will be maintained until the key is released.

DCF MOD	PCCP
SUSTAIN	= -50

● **RELEASE**

(Value: 0 to 100)

This sets the time from the point when the key is released until the envelope level drops to zero. If the key is released before the tone rises to the Sustain level, the level will dwindle to zero from its current value at the time set for Release.

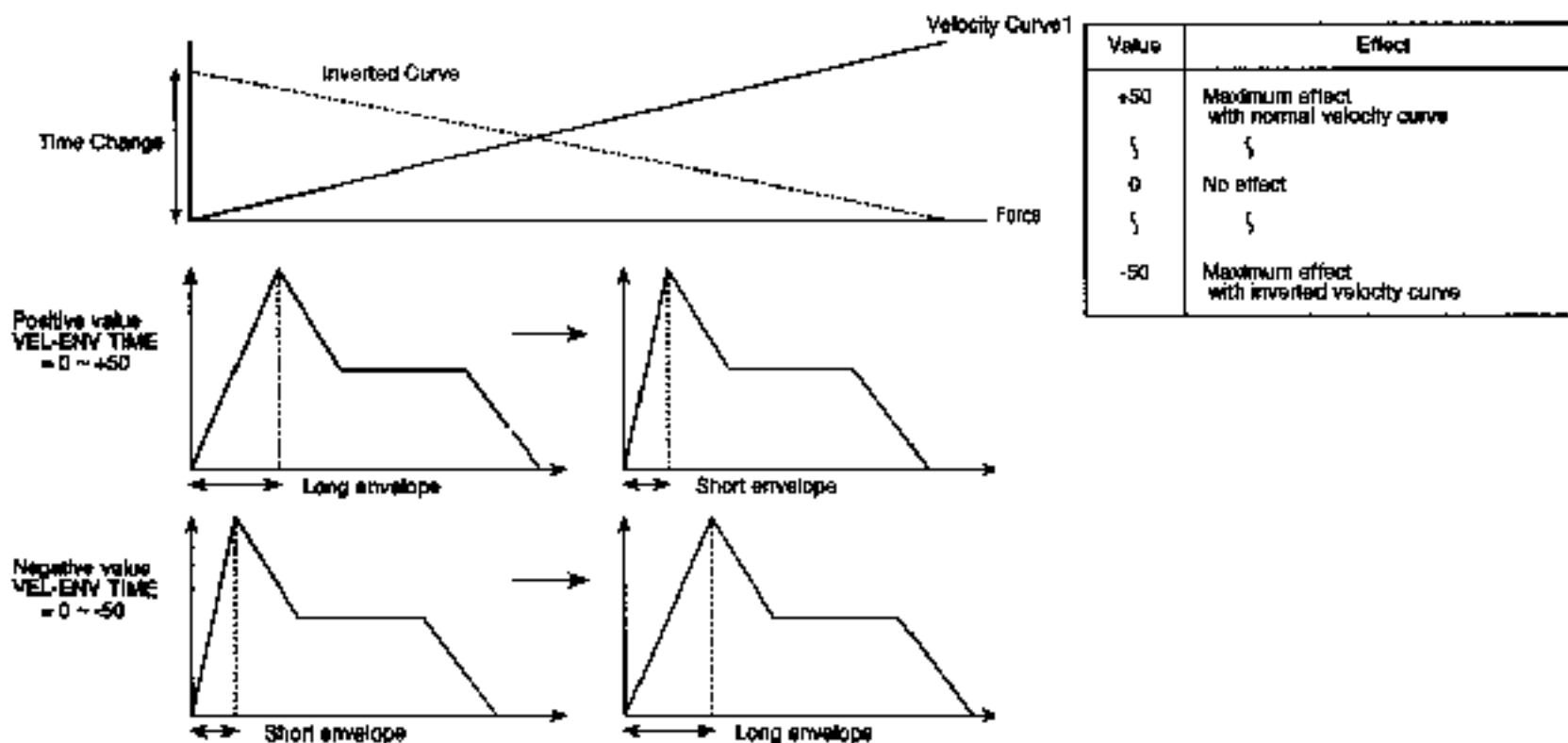
DCF MOD	PCCP
RELEASE	= 100

● **TIME MODULATION VELOCITY (ATTACK)**

(Value: -50 to 0 to +50)

TIME MOD P00P  
VEL = -50

This adjusts the attack time according to how hard the key is struck. Setting a positive value changes the attack according to the Velocity Curve set with S-COMMON, while a negative value will change the attack according to the inverse of the Velocity Curve. (See P. 44)

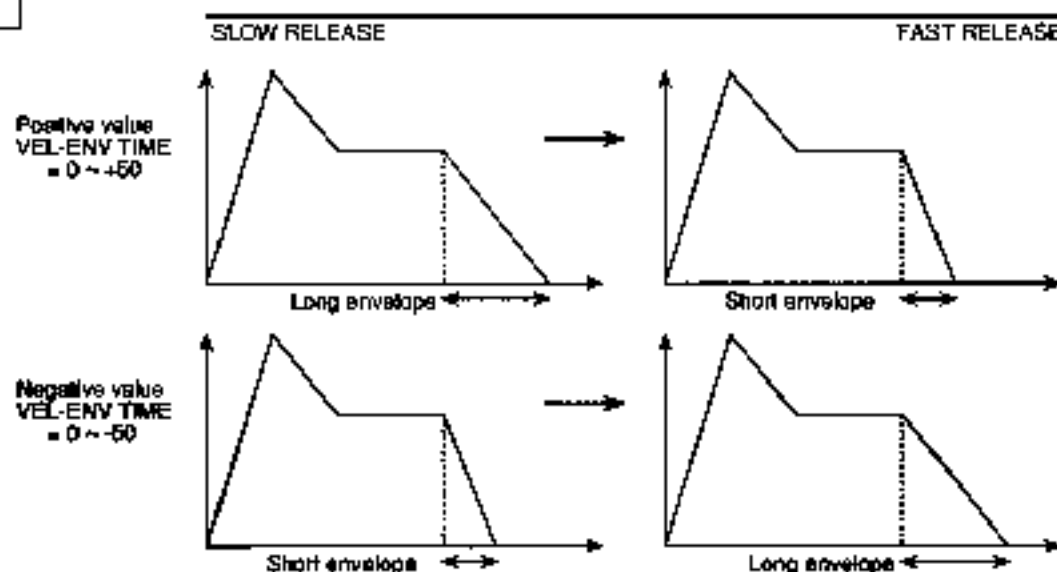


● **TIME MODULATION RELEASE VELOCITY**

(Value: -50 to 0 to +50)

TIME MOD P00P  
RELEASE VEL = -50

This adjusts the release time according to how fast the key is released.

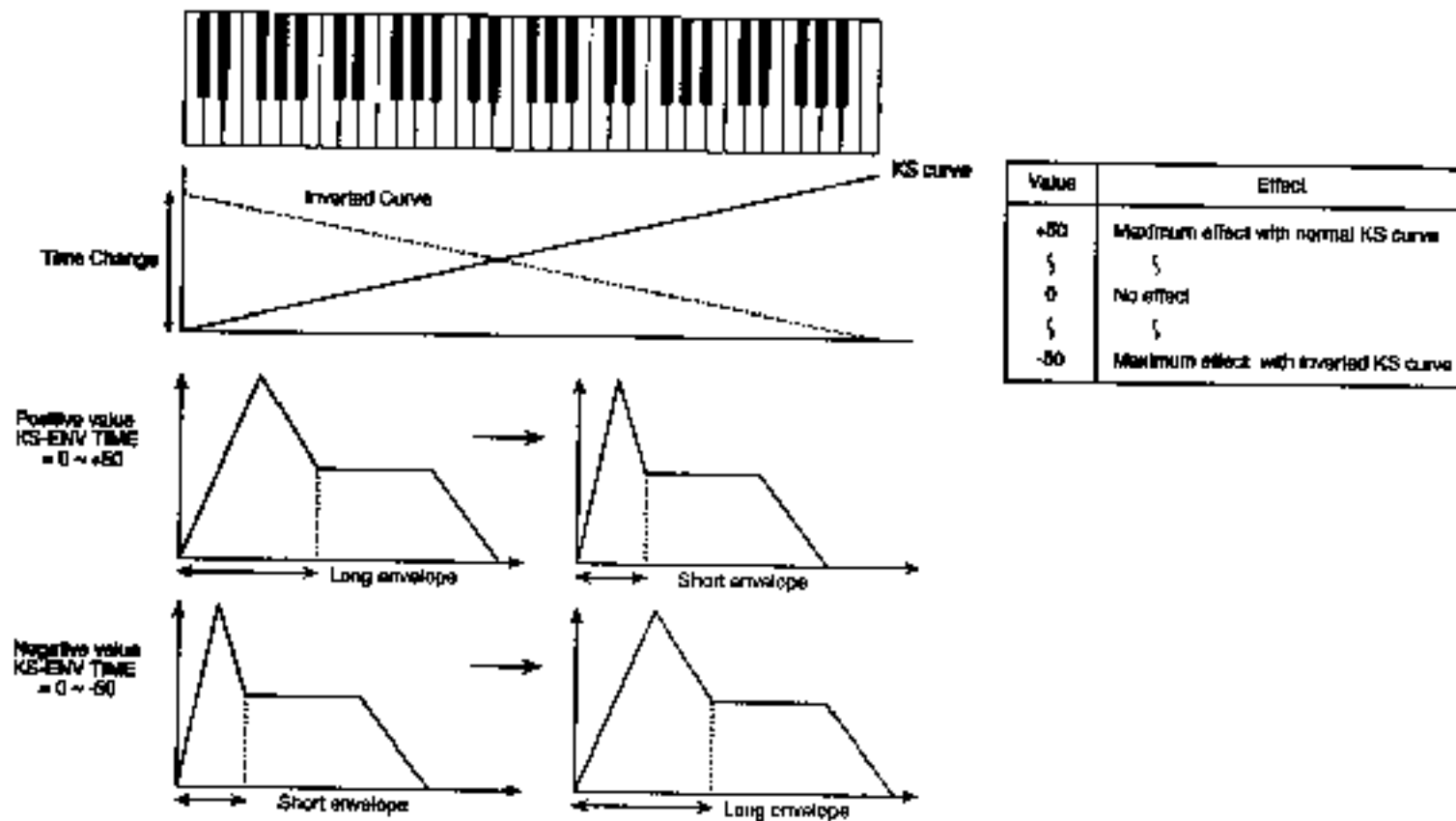


TIME MOD = PCCP  
= 50

### ● TIME MODULATION KS

(Value: -50 to 0 to +50)

This changes the attack and decay times of the envelope according to the position of the key struck. Setting a positive value makes these changes according to the KS Curve set with S-COMMON, while a negative value will make changes according to the inverse of the KS Curve. (See P. 45)



## Editing Capabilities

The COPY function is a handy shortcut if there is a Source or Filter similar to the one you want to use in a different patch or even the current patch. First of all, select the patch containing the Source or Filter you want to use.

### <Procedure>

- (1) Press the **B** S-COMMON several times until the PATCH SELECT display is displayed.
- (2) Select the patch with the VALUE Slider or **+YES** and **-NO**.
- (3) Next, select the Source or Filter that you want to copy. Values are as follows.

S1: Copy the entire contents of Source 1.

S4: Copy the entire contents of Source 4.

F1: Copy the entire contents of Filter 1.

F2: Copy the entire contents of Filter 2.

**Note:** The COPY function copies from a patch as stored in memory. If you want to copy a Source or Filter from a patch being edited, write it to memory before performing the COPY.

COPY PCCP  
ROM SINGLE = IA-16

```
COPY          PCCP
FROM SOURCE=31
```

<Procedure>

- (1) Press the **6** several times until SOURCE SELECT is displayed.
- (2) Select the Source or Filter with the VALUE Slider.

```
COPY          PCCP
FROM EXEC?=Y/N
```

- (3) The message "EXEC?" will then appear. Press **+YES** to copy or **-NO** to cancel.

```
COPY          PCCP
FROM SURE?=Y/N
```

- (4) If you pressed **+YES** in step (3), the message "SURE?" will appear to ask you for confirmation. Press **+YES** to copy or **-NO** to cancel.

### ■ Writing a SINGLE Patch

This is done to store the edited patch in memory.

If you write the data, any data previously stored will be written over. Save patches you don't want to lose on the optionally available card (DC-16), or store it in a computer or sequencer such as the Q-80 using the MIDI DATA DUMP. (See P. 82)

```
RECALL
```

**Note:** Press the **RECALL** if you mistakenly leave the EDIT mode. The screen shown left will be displayed, and you can return to the mode you left by pressing the **EDIT**.

<Procedure>

**Note:** First of all, turn off the PROTECT for the unit (or card) so that writing can be done.

```
INTERNAL
PROTECT      =OFF
```

- (1) While in the SINGLE EDIT mode, press the **WRITE** several times to display the PROTECT screen.

```
CARD
PROTECT      =OFF
```

- (2) Press the **-NO** to turn off the PROTECT.
- (3) Press the **WRITE** several times to display the WRITE screen.

```
TONE WRITE
TO          =1A-1
```

- (4) Use the VALUE Slider or the  and  to select the number of the patch to be written, and then press the .
- (5) The message "EXEC?" will then appear. Press  to execute writing or  to cancel.

```
TONE WRITE SIA-1
TO          EXEC?=Y/N
```

- (6) If you pressed  in step (5), the message "SURE?" will appear to ask you for confirmation. Press  to execute writing or  to cancel.
- (7) Press the  several times to display the PROTECT screen, and then turn the PROTECT switch back on.

**Note:** A new card must be formatted before it can be written to (P. 26).