Real-time effects

Adding real-time effects

When you add **real-time effects** to a timbre, you can control its dynamics and many other qualities by the way you play, just as you would on an acoustic instrument.

Expression input

Depending on which real-time effects controller you select and how you use it, you can change the characteristic sound of the keyboard timbre and its dynamics on a note-by-note basis. Each note can have a quality and loudness slightly different from the one preceding it and the one following it. When you record a sequence, each nuance of expression created with real-time effects is captured in memory.

When you store a timbre, all its real-time effects are stored with it. Thus, real-time effects become part of the **timbre definition.**

figure 6.1
Expression input controllers

expression input controller	keyboard effect
velocity	Timbre affected by the speed of your keyboard attack.
pressure	Timbre affected by the amount of after-attack pressure applied.
pedal1 and pedal2	Timbre affected by how far the pedal is depressed.
mod wheel	Timbre affected by the rotation of the inside wheel at the left of the keyboard.
ribbon	Timbre affected by the position of your finger on the black velvet ribbon just above the keyboard.
breath controller	Timbre affected by amount of breath blown into breath controller.
keyboard control voltage	Timbre affected by where you are playing on the keyboard. The higher you play, the more voltage produced.

Adding real-time effects (con't)

Real-time effects patching

To add real-time effects, you set up a three-way patch between the selected expression input controller, partial timbres and timbre parameters. By default all partial timbres are selected.

Most timbre parameters available for real-time effects patching are marked by a small **white dot** to the right of the button. These include

- all buttons under **volume envelope** and **harmonic envelope,**
- **partial tuning** and **partial volume,**
- **track volume,**
- **f.m. ratio,**
- **vibrato rate, depth** and **mod depth,**
- **stereo rate, depth** and **pan,**
- **portamento rate,**
- **repeat/arpeggiate rate,**
- **partial chorus,**
- **dynamic envelope,**
- **vibrato attack/decay.**

As you hold down the **expression input** button, the timbre parameters are either lit, blinking or flickering, indicating whether they are already patched or available for patching, as shown on the table opposite.

button state	meaning
On-steady	The expression input is already routed to the parameter in the normal fashion.
Blinking	The expression input is routed to the parameter in the inverted mode.
Flickering (a brief flash once per second)	The parameter is available for patching.

figure 6.2
Timbre parameter button states

Adding real-time effects (con't)

Adding real-time effects to the keyboard timbre

To add real-time effects to the keyboard timbre, follow these directions:

1. Press the desired **expression input** button and hold it down.

   The button lights and the display window shows:

   PRESS BUTTONS
   FOR RTE PATCHING

   One or more **partial timbre select** buttons starts blinking. (The default is on for all four partial timbres.)

   The timbre parameter buttons are on, blinking or flickering.

2. Press one or more **partial timbre select** button(s) to select the partial timbre(s) where you want the real-time effects routed.

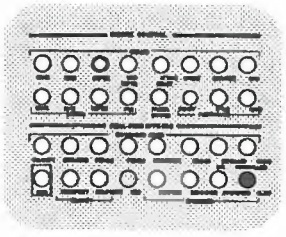
3. Continue to hold down the **expression input** button while you select the desired **timbre parameter** button.

Adding real-time effects in the inverted mode

You can also add real-time effects to the keyboard timbre in the inverted mode. When you do this, the relationship between the expression input controller and the timbre parameter is reversed. For example, if you patch **pressure** to **partial volume** in the normal fashion, then the harder you press the keys, the louder the sound. If you patch **pressure** to **partial volume** in the inverted fashion, then the harder you press the keys, the softer the sound will be.

To add real-time effects in the inverted mode follow the instructions on the preceding page, but press the desired **timbre parameter** button **twice** so that it is blinking.

Adding real-time effects (con't)



clear
panel 5

Removing real-time effects from the keyboard timbre

You can remove previously programmed real-time effects by clearing the patching between the expression inputs, the timbre parameters and/or the partial timbres. Removing an RTE patch from a timbre parameter does not affect the parameter setting.

To remove a single RTE patch:

1. Press and hold the **clear** button.

   All patched **expression input, timbre parameter,** and **partial timbre select** buttons light.

2. Press the **expression input, partial timbre select** and/or **timbre parameter** button(s) that mark the patch you want to remove.

   The selected expression input is no longer patched to the selected partial timbre and/or timbre parameter.

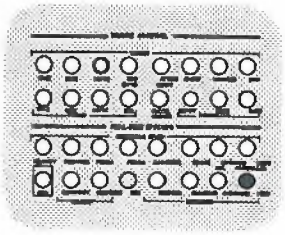
If you press a **timbre parameter** button without also pressing a **partial timbre select** button, the expression input remains patched to the partial timbre. Similarly, if you press a partial timbre select button without pressing a timbre parameter button, the expression input remains patched to the timbre parameter.

Removing several expression input routings

You can remove all **expression input** routings simultaneously.

1. Press and hold the **clear** button.
2. Run a finger across all eight **expression input** buttons.

   All the **expression input** routings are cleared. The routings between the partial timbres and timbre parameters are still in effect.



clear
panel 5

You can remove all the partial timbre routings simultaneously.

1. Press and hold the **clear** button.
2. Press all four **partial timbre select** buttons (one at a time, simultaneously, or in any fashion).

   All partial timbres are cleared of real-time effects routings. The routings between the expression inputs and timbre parameters remain in place, but are not assigned to the timbre.

Expression inputs

The Synclavier offers eight different expression input controllers.

Velocity and pressure

When you patch **velocity** to a partial timbre and one or more timbre parameters, the dynamics or expression of the timbre varies according to the velocity with which each key is depressed. For example, if **velocity** is patched to **partial volume**, the volume depends on the velocity of the keystroke.

When you patch **pressure** to a timbre parameter, the dynamics or expression of the timbre varies according to how much pressure is applied to the bottom of the keystroke. For example, if **pressure** is patched to **partial volume**, the volume of the notes increases as you increase pressure on the key.

The **velocity** input is only measured at the beginning of the note; the **pressure** input is an after-touch control. Although any expression input can be patched to any timbre parameter, some patchings make little sense. For example, you usually hear no effect if you patch **pressure** to **ve attack**, since by the time you are able to vary the pressure of a key, the attack of the timbre has already sounded.

On the other hand, if you patch **velocity** to **partial tuning**, you get different pitches each time you press a key, but you can't bend the note, since the time to bend a note is after it has begun to sound.

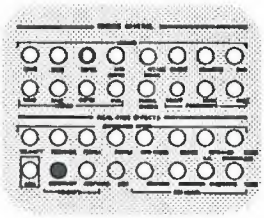
Velocity adjustments

When you patch **velocity** to a timbre parameter, you can adjust both the dynamic range available for control and the keyboard response to your touch. These two settings interact to give you the widest possible range of keyboard response to velocity real-time effects.

For example, if you want to reach maximum value with a moderate touch over a large range of possible values, set **velocity sensitivity** to its highest setting and **velocity response** to a medium setting. If you want a smaller range of dynamics with maximum value reached only with a very heavy touch, set **velocity sensitivity** to a mid-range setting and **velocity response** to its minimum.

You should experiment with both settings on a variety of timbres to become familiar with the possible settings that suit your playing styles.

Velocity and pressure



velocity sensitivity panel 5

Setting velocity sensitivity

1. Make sure the keyboard timbre has **velocity** patched to the desired partial timbre and timbre parameter.

2. Press **velocity sensitivity.**

   The button lights, and the display window shows

   [number] VEL SENS

3. Use the control knob to select a sensitivity setting between 0 and 100.

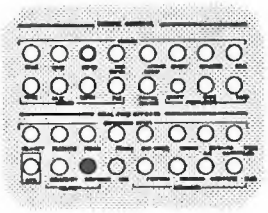
For example, if the keyboard timbre has **velocity** patched to **partial volume** and **velocity sensitivity** is set to 100 (the default setting), a full range of volume is available when you play. When your touch is very soft, you get almost no volume; when you play rapidly, you get the full volume programmed for the timbre.

On the other hand, if **velocity sensitivity** is set to 0, you get the full programmed volume of the timbre no matter how slowly or quickly the keys are played. With a setting of 0, there is simply no dynamic range.

figure 6.3
Velocity sensitivity settings

setting	dynamic range
100	maximum
50	
25	
10	
0	none

Velocity and pressure (con't)



velocity response panel 5

Setting the velocity response

1. Recall the desired timbre to the keyboard.

2. Patch **velocity** to the desired partial timbre(s) and timbre parameter(s).

3. Press the **velocity response** button.

   The button lights and the display window shows

   [number] VEL RESP

4. Use the control knob to select a response value between 0 to 9; or press the button repeatedly to step through the ten values.

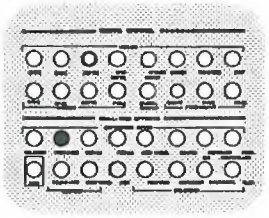
The default velocity response setting is 3, which corresponds to an average response or moderate touch. Higher numbers correspond to lighter touches while lower numbers correspond to heavier touches.

For example, if the keyboard timbre has **velocity** patched to **partial volume** and you dial in a velocity response of 9, a fairly light touch can be used to achieve full volume. If, on the other hand, you dial in a setting of 0, you will need a very heavy touch in order to play full volume.

figure 6.4
Velocity response settings

setting	keyboard touch
0	very heavy
1	
2	
3	
5	
6	
7	
8	
9	very light

Velocity and pressure (con't)



pressure panel 5

Adjusting the pressure setting of a timbre

When you first press **pressure**, you see in the display window

0.200 RESPONSE
SELECT PATCHING

A value of 0.200 is the default setting for the **pressure response filter,** a filter used to smooth out the effects of abrupt pressure changes on the real-time effects.

Using the control knob, you can select settings between 0.000 and 1.000. A value of 1.000 gives the fastest possible response with any variation in pressure, creating an instant change in the timbre parameter patched to **pressure.** Lower settings give slower responses, making possible very long crescendos or diminuendos or very slow pitch changes. With a setting of 0.000, you will get no response at all, no matter how hard you press the key.

The pedal inputs

There are two pedal input jacks on the back panel of the velocity/pressure keyboard unit. Although either one can be used for any kind of real-time effects, you may find it convenient to reserve one pedal for overall volume control and the other for other kinds of real-time changes in the partial timbres.

- When the pedal is patched to **partial volume** in the normal fashion and is not turned on, no sound is heard. Nor is there any sound while the pedal is in the "up" position.

  To increase the volume, push the pedal down. Maximum volume is reached when the pedal is pushed all the way down. Volume changes occur instantly, even in the middle of a note.

- With the first pedal reserved for volume changes, the second pedal can be patched to other real-time effects.

In general, the pedal is most effective when patched to timbre parameters that occur throughout the duration of a note, such as **partial tuning** (for pitch bending or sliding notes), **vibrato rate** or **depth** or **stereo rate.** Patching the pedal to FM parameters, such as **harmonic sustain** or **FM ratio,** is also effective, as is patching it to **repeat/arpeggiate rate.**

If the patching is done in the normal fashion, all selected real-time effects are set at 0. As you press the pedal down, the values for the selected RTE parameters are gradually increased. When the pedal is all the way down, the RTE parameters equal the time intervals or levels originally dialed in on the timbre parameter.

The ribbon controller

The ribbon controller is the black velvet ribbon located just above the keyboard. To use it, run your finger along the depressed middle area. (You must press it firmly to maintain a good contact.) The point at which you first press it becomes the pivot point for the real-time effect patched to ribbon.

For example, if you want to control the bending of a note with the ribbon, follow the instructions below.

1. Patch **ribbon** to **partial tuning.**

2. Hold down a key on the keyboard.

3. Place your finger anywhere on the ribbon and then move it to the right or left.

   As you move your finger to the right, the note you are playing rises in pitch. As you move your finger to the left, the note lowers in pitch. As you pass the point at which you first pressed the ribbon, the note passes through its original pitch.

4. Lift your finger from the ribbon.

   The note returns to its original pitch.

When you place your finger on the ribbon controller, there is no change in the parameter to which the ribbon controller is patched. The amount of change is determined by the distance your finger moves; the direction of change is determined by the direction of finger movement. If you place your finger at one end of the ribbon and move it to the other, a maximum amount of change is produced.

Ribbon controller filter

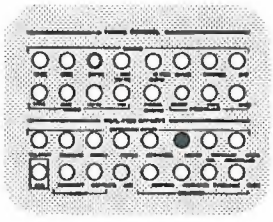
The ribbon controller filter controls the response when you release the ribbon controller.

When you press the **ribbon** expression input button, the display window shows

0.400 RESPONSE
SELECT PATCHING

The value of 0.400 is the default setting for the ribbon controller filter.

Dial in a higher setting for a faster response or a lower one for a slower response. The range is from 0.000 to 1.000.



ribbon
panel 5

Keyboard control voltage and breath controller

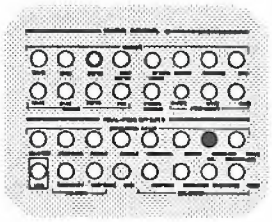
Keyboard control voltage

When keyboard control voltage is patched to a timbre parameter, the parameter changes according to the area of the keyboard on which you are playing.

The keyboard control voltage increases as you play on the keyboard from left to right. Thus, the settings of the parameter reach maximum as you approach the right end of the keyboard and zero as you approach the left end.

To use the keyboard control voltage most effectively, left and right keyboard limits should be entered. The left key limit establishes the key corresponding to 0 volts. Keys to the left of this key also use 0 for the keyboard control voltage. The right key limit establishes the key corresponding to maximum voltage. Keys to the right of this key also use maximum voltage.

To set the left and right keyboard control voltage limits, follow the procedure below.



keyboard c.v.
panel 5

1. Press and hold the **keyboard c.v.** button.

2. Play two notes on the Synclavier keyboard. The notes can be played simultaneously or one at a time.

   The lower note establishes the left limit; the higher note establishes the right limit.

Breath controller

On the back panel of the keyboard unit is a jack labelled **breath controller.** When a breath controller is plugged into this jack, you can patch the breath controller expression input to selected partial timbres and timbre parameters.

To use the breath controller most effectively, cover the hole on the bottom of the breath controller with your thumb or a piece of tape and suck your cheeks in and out to vary pressure. You may want to adjust the trim pot located on the bottom of the breath controller with a screw driver.

Dynamic envelope

The dynamic envelope setting selects exactly which partial timbres should sound based on the **dynamic level** of the note. Used with real-time effects patching, this feature provides brighter or more "punchy" timbres for louder notes. A wide variety of special effects can be created in this manner.

The **dynamic envelope low** and **high** buttons can be effectively patched to these expression input controllers:

velocity
ribbon
keyboard c.v.
pedal
pressure

In order to set a dynamic envelope, the keyboard timbre must contain more than one partial timbre. Each partial timbre will be set to a particular dynamic range, with a high level and a low level.

Setting a dynamic envelope

1. Press the desired **partial timbre select** button.
2. Press **dynamic envelope:low.**

   The button lights and the display window shows

   [number] DYN LEVEL

3. Use the control knob to select a value between 0 and 8.

   This is the low value of the selected partial timbre's dynamic envelope.

4. Press **dynamic envelope:high.**

   The button lights and the display window shows

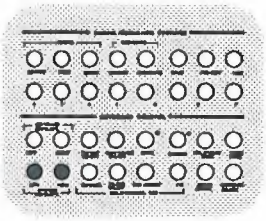
   [number] DYN LEVEL

5. Use the control knob to select a value between 0 and 8.

   This is the high value of the selected partial timbre's dynamic envelope.

Each partial timbre can have a dynamic range completely separate from another partial timbre. Or the partial timbres can overlap.

Once the dynamic envelope for a timbre is set, it must be patched to an expression input in order for partial timbre selection to take place. If not, all partial timbres will sound simultaneously.



dynamic envelope low, high
panel 4

Pitch and mod wheels

The pitch wheel and mod wheel

There are two wheels located to the left of the keyboard.

- The **pitch bend wheel** (the left wheel) controls only the pitch of a whole timbre.
- The **mod wheel** (the right wheel) can be patched to any partial timbre and timbre parameter.

Either wheel increases the settings as you turn it away from you and decreases them as you turn it toward you. The pitch bend wheel returns to the center position when released.

figure 6.5
Real-time effects summary

- To add real-time effects to the keyboard timbre, set up a three-way patch between an expression input controller, a timbre parameter and a partial timbre.
- To remove real-time effects patching from the keyboard timbre, press and hold the **clear** button while you press the desired expression input controller, timbre parameter and/or partial timbre buttons.