

# STS 5000



**creamw@re**®  
fidelity at work.

Version 1.0

STS 5000

Sampler Page

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# Forward

With the STS 5000 you now have a high-performance, extremely flexible sampler available directly within *your* **SCOPE Fusion Platform** (SFP). Its 16-part Multi mode enables you to create complete arrangements using only the STS 5000.

The ability of the STS 5000 to import Akai S-1000 and S-3000 programs as well as files in the SoundFont format gives you access to the most important sampler sound libraries currently available. The individual outputs provided in addition to the main stereo outputs allow individual processing of all programs within your project. Naturally, you can also route any or all of these outputs loss-free via one of the ADAT interfaces to an external digital mixer or, via an external D/A converter, integrate them into your analog recording setup.

In generating sound, the STS 5000 uses two different resources to its advantage – the computer's CPU and the SFP DSPs. Through the use of both types of processing power, it is possible to generate significantly more voices than would be the case with, for example, a virtual analog synth which is computed exclusively by the DSPs.

Thanks to this approach, enough DSP capacity remains available (dependent to some extent upon your system's configuration) to permit, for example, computation of effects. At the same time, the CPU also retains enough computing capacity to permit working with other applications. Of course, any system can be taxed to its limits. The performance capabilities of the complete sampler system should always be evaluated with due regard to your hardware configuration. If you plan to use a MIDI sequencer program along with the STS 5000, you will certainly need to have a fast CPU.

The ability of the STS 5000 to perform not only "normal" playback of transposed samples but also real-time time-stretching and/or pitch-shifting makes it unique in its class. In conjunction with the integrated formant correction function, you at last have complete, independent control over the pitch, playback time and formant content of a sample. It must be mentioned here that time-stretching, pitch-shifting and formant correction functions are executed by the computer's CPU. Therefore, the maximum achievable voice count depends upon the level of performance of the CPU.

The STS 5000 features an extremely high-performance and above all flexible filter section including 25 different filter types. Depending upon the specific type of filter you select, you have control over the most important filter parameters, such as frequency, resonance and gain. In addition, resonance can be modulated via a freely-selectable source.

Another word concerning system configuration: If you plan to load a lot of samples at one time, you should make sure to have adequate RAM available. Since the STS 5000 uses the normal system RAM of your PC for loading samples, memory expansion is easy and not particularly expensive – and incidentally, brings benefits when working with other applications as well. 128 MB should be viewed as a lower limit for being able to work ‘reasonably’. 256 MB should provide enough reserve capacity to accommodate even large multi-program arrangements.

In developing the STS 5000, great care was taken to ensure that the relatively large number of editable parameters would remain manageable. The fundamental structure of the sampler was the decisive factor in determining the form which the user interface has taken. Accordingly, the main panel displays the topmost structure, the Multi. The **Options** drawer of this panel contains the program parameters, and the **KeyGroupList** panel provides access to individual key groups, zones and samples. At the bottom level of the editing hierarchy is the integrated **Sample Editor**, where you can perform all important sample editing functions, from simple truncation to loop editing. The STS 5000, then, takes a ‘top down’ approach to sample programming.

As you will discover for yourself when you begin working with the STS 5000, this is a fully professional sampler which, in comparison to its hardware ‘competition’, leaves nothing to be desired and is in a number of significant respects superior. Sample editing, memory-expansion options, and the management of programs spanning multiple hard disks and CD-ROMs are just a few examples.

We hope your work with the STS 5000 both enjoyable and rewarding!

# Introduction

In this chapter we'll provide an overview of the control elements and basic operation of the STS 5000.

## Loading the Sampler

Start your SFP software and use the File Browser to navigate to either **//Pulsar/Devices** or **//SCOPE/Devices**, depending on which system you are using. Drag the STS 5000 into the Routing window. The STS module is now loaded into the Project, and the STS icon appears in the lower left corner of the desktop (in the Finder in the Mac version).

## Control Surfaces (Panels)

The STS 5000 provides a number of independent control surfaces or panels (the two terms will be used interchangeably throughout the manual). You can arrange these freely on the desktop, and in some cases resize them as well.

## Main Panel

Open the main panel by double clicking either on the STS 5000 icon or on the module in the Routing window; or by right clicking (Ctrl+click=MAC) on the module to call up the context-sensitive menu where you can select **Open STS 5000**. This is the main Multi-program configuration panel used to administer up to 16 independent programs or instruments. The **Program** drawer provides direct access to the various parameters of the selected program.

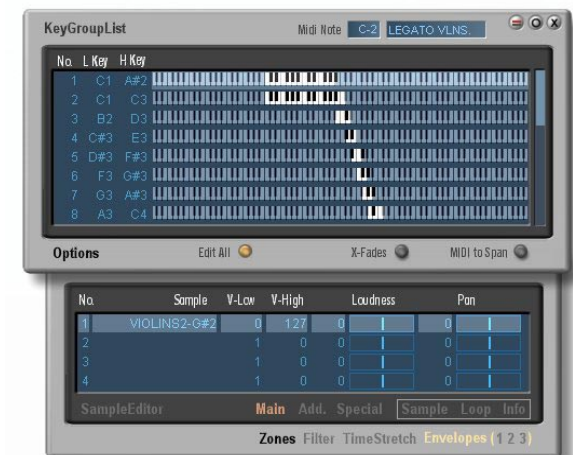


## KeyGroup Panel

Click on **KeyGroup** at the bottom of the main panel to open the **KeyGroup** panel. (Alternatively you can bring up the STS 5000 module's context-sensitive menu as above and select **Key-GroupList**).

This is where you assign samples to key groups. Individual key group assignments are created and configured in the **Options** drawer.

Note that the Options drawer also provides access to the sampling section and the Sample Editor.





# SampleEditor

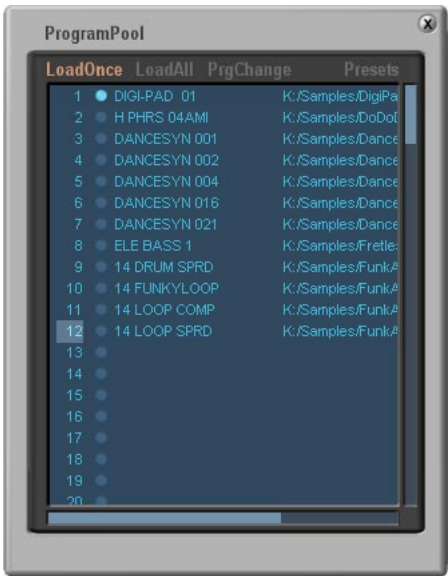
The Sample Editor implements fast, convenient recording and editing at the individual sample level. A sample, or portion of a sample, can be cut, copied, normalized, muted, or extracted. Loop points can be set, cleared, or adjusted. This is also where you record new samples.



# ProgramPool

The ProgramPool has several functions. Open the ProgramPool by clicking **Pool** on the main panel.

The ProgramPool provides a central location where you can collect together your favorite programs, import Sound-fonts, and assign programs to the 127 MIDI program change slots (first 127 programs only).



# Preset List

Open the Preset List by clicking on **Presets** on the main panel, or by selecting **OpenPresetlist** from the module's context-sensitive menu. Presets allow you to store the current state of the STS 5000 so you can restore it later. When you restore a Preset, all parameters are loaded back into the STS 5000, resetting it to the precise state it was in when the Preset was stored. This includes reloading all the relevant programs and their associated samples.



## Connections

The following MIDI and audio connections are available on the STS 5000 module.

**MIDI In:** Input to connect a MIDI source, such as the MIDI Source or the Sequencer Source modules.

**RecL/RecR:** Inputs for an audio signal to be recorded as a new sample.

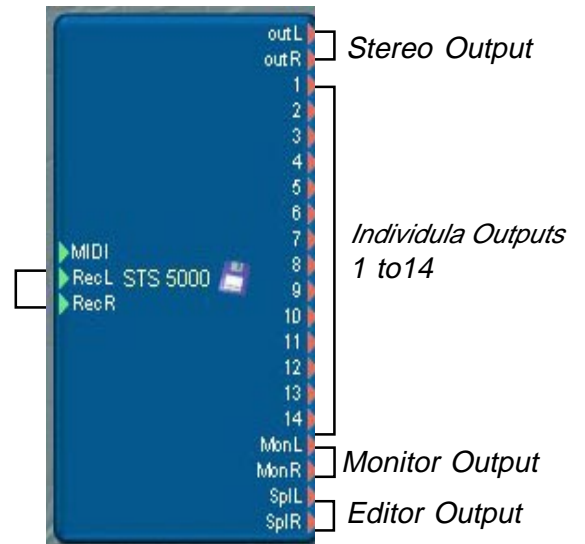
**OutL/OutR:** Stereo output for all programs whose current **Level** is greater than 0. The signal is the stereo sum of all program signals (i.e. a left/right mix).

**1-14:** In addition to the stereo mix, 14 independent outputs are also available. Program output can be routed through these to allow for additional processing of individual program output.

**SpIL/SpIR:** These outputs are used to provide the reference signal when editing samples in the Sample Editor. When the editor's 'Start' button is pressed, the raw sample will play through these outputs without any additional processing.

**MonL/MonR:** These outputs provide the monitor signal for sample recording.

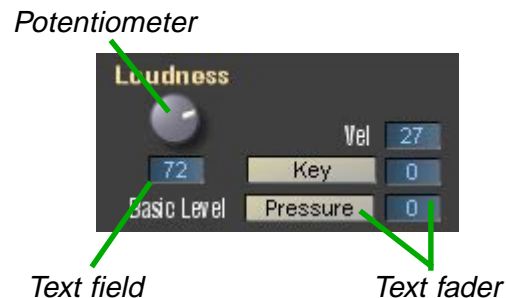
*MIDI Input  
Sample Inputs*





## Settings and Adjustments

There are several ways to adjust the various parameters available to you in the STS 5000.



### Rotary Controls (Potentiometers)

Click on the control and then, while holding the left mouse button, move the mouse cursor in an 'orbit' around the knob to change the setting. The further away from the knob (i.e. the larger the orbit) the finer the precision. Double click on the knob to set it to a central or neutral position. A second double click will return it to its previous position.

### Editable Text Fields

Some settings display their values in an associated editable text field. In this case you can enter the value directly from the computer keyboard. Select the text field with the mouse, and then enter the value using the numerical keypad.

If you enter a value that exceeds the maximum or minimum value, the maximum or minimum respectively will be entered by default. Confirm an entry by hitting <Enter>. If you select an object other than the text field you are editing you will not be able to enter a new value until you select the field again.

### Text Fader

For technical reasons, many parameters are adjustable only by using our aptly-named **Text Fader** (a combination of a text field and a fader control). If the value is numeric, it can be entered directly from the keyboard as above. Or, you can click on the fader with the (left in PC version) mouse button and move the mouse either horizontally or vertically to adjust the value as below:

**Horizontal motion:** Adjusts the value with fine precision

**Vertical motion:** Makes coarse adjustments to the value

If the Text Fader offers only a selection of textual choices (as in selecting a modulation source, for example) then you must use the fader to select from among the values. A vertical motion is recommended for this type of selection.

## Switches

Some options can be switched either on, or off. Click on the switch to change the state from one to the other. A switch is 'on' if it is glowing.



## Graphical Displays

Certain parameters feature graphical control interfaces in addition to the conventional controllers such as potentiometers and faders. Such a display serves not only to clarify the settings visually, it can also be used to make adjustments directly from within the display. For example, you can move the nodes on an envelope graph to adjust the envelope's timings and levels. For more information, refer to the sections for the individual displays.



Graphical display: envelope

## Lists

Sometimes groups of parameters are organized into lists as in the main panel (multi-program list), the key group list and the zone list. This organization clarifies the relationships among the parameters and also makes for convenient navigation using the keyboard.

1	14.9 SNARE-L	0	127	Track	0	-50
2	14.9 SNARE-R	0	127	Track	0	50
3		0	0	Track	0	0
4		0	0	Track	0	0

## Navigating through Lists

You can move the selection cursor to the next parameter on a line by pressing the <Tab> key. At the end of the line, the cursor will jump down to the first parameter on the next line. Move back to the previous parameter by using <Shift+Tab>.

You can also use the four arrow keys to move through the list. The cursor will move in the direction of the arrow. The <Home> key moves the cursor to the respective parameter in the first line, and the <End> key takes you down to the last line.

## Adjusting Values in Lists

A parameter in a list is indicated as being selected when it is highlighted (this is the 'selection cursor'). A selected value can be adjusted. There are several different kinds of adjustable parameters.

### Parameters with a Numeric Value:

Click on the value and hold the mouse button while moving the mouse vertically (coarse adjustment) or horizontally (fine adjustment).

Select the parameter and enter the value directly from the keyboard. Hit <Enter> to confirm. You can continue to adjust the value as long as the parameter remains selected.

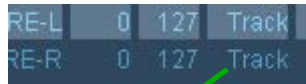


numeric value

Bipolar text faders can be conveniently set to zero by double-clicking them.

### Parameters with Several Options:

Click on the value and change it by moving the mouse cursor vertically while holding down the mouse button.



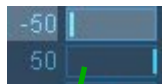
*Text option*

### Parameters Controllable by Faders:

Click on the fader and move the mouse cursor vertically (coarse adjustment) or horizontally (fine adjustment) while holding down the mouse button.



*Level fader*



*Fader at middle position*

Bipolar text faders can be conveniently set to zero by double-clicking them.

### Parameters Defined as Note Values:

Click on the value and move the mouse cursor vertically for coarse adjustments or horizontally for fine adjustments while holding down the mouse button.



*Note value*

You can also use the keyboard to enter values. Type in the note name and octave, or enter the MIDI note number and confirm by hitting <Enter>.

You can also enable **MIDI to Span** on the main panel to permit entry of note values via the MIDI keyboard.

### Additional Keyboard Controls:

You can use <Page Up> (increase) and <Page Down> (decrease) to adjust selected values.

# Loading and Saving

## Loading AKAI 'S' Programs

In the Browser, change to the directory that contains your STS-, Akai programs and set the filters so that only these are displayed.

Use drag & drop to move a program (indicated by a keyboard icon) from the File Browser to one of the multi-program slots in the main panel. The program will load and appear as 'selected' in the program list.

The program loads with all its relevant parameter values. This means that STS 5000 multi parameters for this slot, such as the MIDI Channel, level, and pan, will be set. If, however, you drag a program into a slot that is already occupied, the

slot's current values will be maintained. This allows you to try out various programs without having to readjust multi parameters such as output, level etc. which would be otherwise overwritten.

To load a program such that it does overwrite the current settings, hold the <Ctrl> key while dropping the program into a slot.

## Loading Soundfont Files:

Use the Browser to change to the directory that contains your Soundfonts, and set the file filters so that only these are displayed.

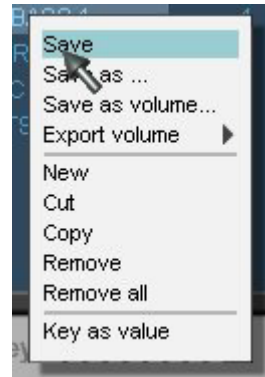
Use drag & drop to pull a program (indicated by a red keyboard icon) from the File Browser to one of the multi-program slots in the main panel. The program will be loaded and appear as selected in the program list.

To access the other Soundfont presets you must use the **Pool**. Drag the Soundfont first into the pool to list the presets contained therein. Now you can load the other Soundfont presets into the STS multi slots. As above, the value of an occupied slot is not overwritten when you drag a Soundfont into it.

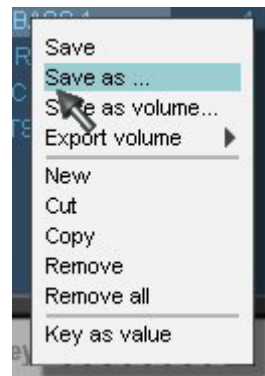
## Saving Programs

As you have seen, an STS 5000 multi-program list contains up to 16 different, individual programs. These are loaded by reference. In other words, loading a new multi list (e.g. by calling a preset or loading a project) will load all programs as they are stored on disk. The multi list knows only the name of the program - multi parameters are stored independently of the program values. It follows, then, that you must store changed programs separately if you want them to be loaded later to reflect the changes. If you don't want to overwrite an existing program, save it under a new name. The reference in the multi list will immediately reflect the new program. This also prevents other multi presets which use a particular program to reflect unwanted changes.

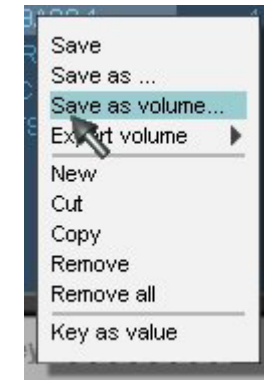
Use the multi-program list's context-sensitive menu (right click/'Ctrl'+click in Mac OS on a slot in the multi list) to save a program. The following menu appears:



**Save:** Select **Save** to store the program as an STS 5000 program. If the program had been loaded in the Akai format, it will be replaced. If you do not want to replace the Akai program, select **Save as...** and assign a new name to it.



**Save as:** If you do not want to replace an existing program of the same name, use **Save as...** to store it under a new name or in a different directory.

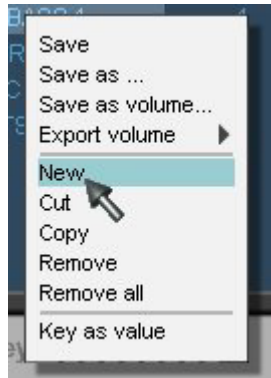


**Save as Volume:** Choose **Save as Volume...** to write a program, including its samples, into a specified directory. The references are adjusted accordingly (unlike the Export function).

This means that the reference in the multi-program list now refers to this program and the samples located in the new directory or location. The program and sample data in the original location are unaffected.

**Note:** The term “Volume”, which in Akai samplers corresponds to the complete contents of the sampler, refers instead in the STS 5000 to a Multi.

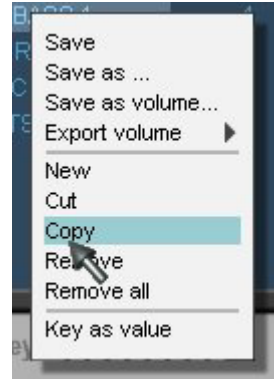
## Creating New Programs



Select **New** to initialize a new empty program. This is always the first step when you wish to use particular samples not yet included in an existing program.

You can also use the keyboard to initialize a new program. Select a free slot and press the <Insert> key.

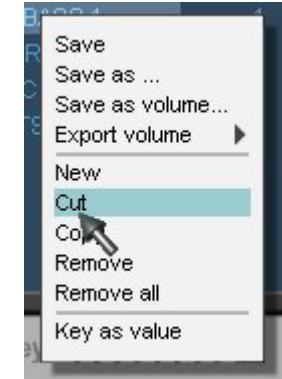
## Copying Programs



Sometimes you may want to include the same program twice (once again in a modified form) within a multi list. Right click ('Ctrl'+mouse button in Mac version) on the program to call up the context-sensitive menu and select **Copy**. Select the desired slot for the copy, and right click to bring up the menu once more. This time select **Paste '...'**. If you select a slot which already contains a program, the existing program will be replaced.

You can also use the keyboard to copy and paste a program. First select the slot to copy and press <Ctrl+C>/<Apple+C>. Change to the slot into which you want to insert the copy and press <Ctrl+V>/<Apple+V>.

## Moving Programs

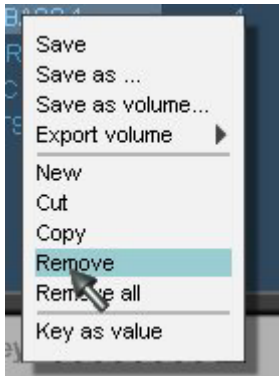


To move a program from one slot to another, right click ('Ctrl'+mouse button in the Mac version) on the program to call up the context-sensitive menu and select **Cut**. Select the new destination slot and right click to bring up the menu once more. This time select **Paste '...'**. If you select a slot which already contains a program, the existing program will be replaced.

You can also use the keyboard to cut and paste a program. First select the source slot and press <Ctrl+X>/<Apple+X>. Change to the slot into which you want to insert the program and press <Ctrl+V>/<Apple+V>.



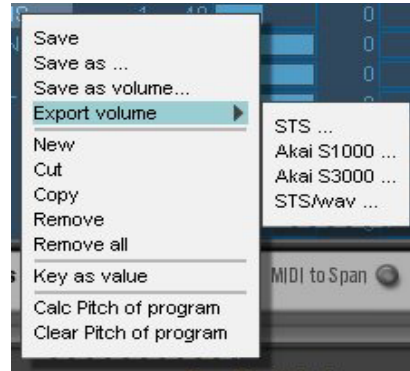
## Deleting Programs



To delete a program from the multi list use the **Remove** option in the context-sensitive menu. You can delete all programs at one time from the multi list using the **Remove all** menu option.

You can also use the keyboard to delete a program. Select the program and press the <Delete>/<NumLock> key.

## Exporting Volumes



Often a program will contain samples from various locations in your system.

The **Export Volume** feature has been implemented to make it easy to transfer such a program from one system to another without having to organize and transport all the associated directories and media. This feature copies the program and all associated samples into a single directory of your choice. You can then easily copy this to a CD or a removable disk for transfer to another system.

The export function allows you to choose between three formats: the **STS** native format, the **AKAI S1000** format and the **Akai S3000** format. Access this function by selecting **Export Volume** from a program's context-sensitive menu. A sub menu lets you select the desired export format.

**When a program is exported in STS format, all included samples are written in WAV format. Files in S and AIF formats are converted.**

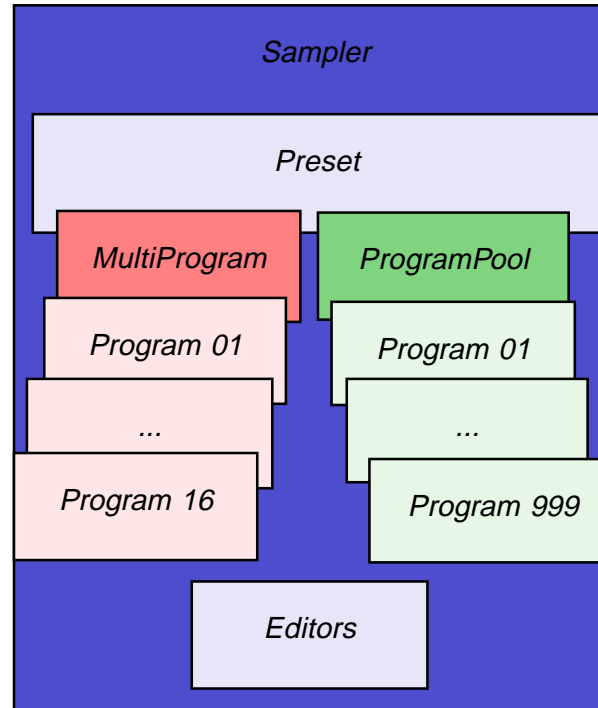
# The Structure of the STS 5000 Sampler

## Introduction

At the topmost level is the sampler itself with its various control elements (Main Panel) and the module representation in the Routing Window. The functional unit directly below this is the Multi Preset List and, independent of it, a list of up to 999 programs – the Program Pool.

A Multi list consists of up to 16 loaded programs, all of which are simultaneously active. Each program can respond on one of the 16 available MIDI channels.

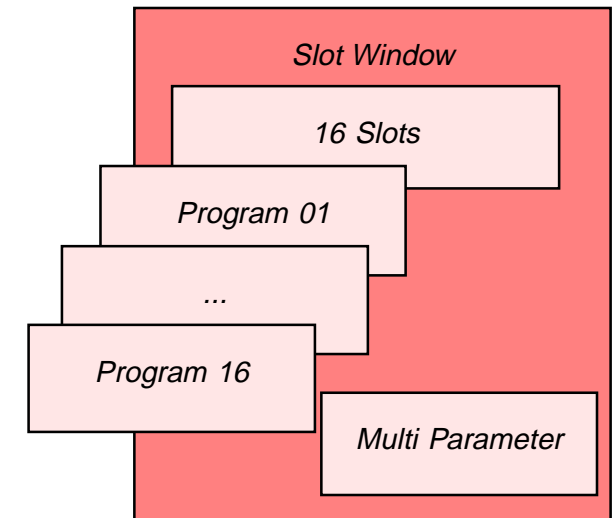
These programs can be loaded manually, or, alternatively, any of the 16 slots can be assigned a program out of the first 128 programs in the Program Pool via MIDI Program Change.



It is rare that a well engineered program uses only a single sample. Usually, in order to reproduce an instrument as accurately as possible (especially with natural instruments) several samples are combined in 'Key Groups'. This is often referred to as 'Multi Sampling'. The samples themselves are referenced from the key groups.

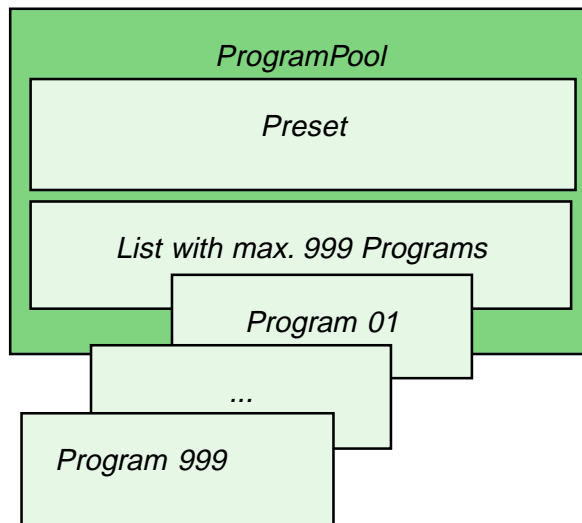
## Multi Program List

The Multi Program List contains up to sixteen loaded programs and is where the program settings (Main/Additional) are administered. The programs themselves contain similar settings; however, the settings as adjusted in the Multi list override these. Changes in the multi settings do not affect the original settings as saved with the programs. You may, at your option, replace the program settings with those in the multi and save them with the program.



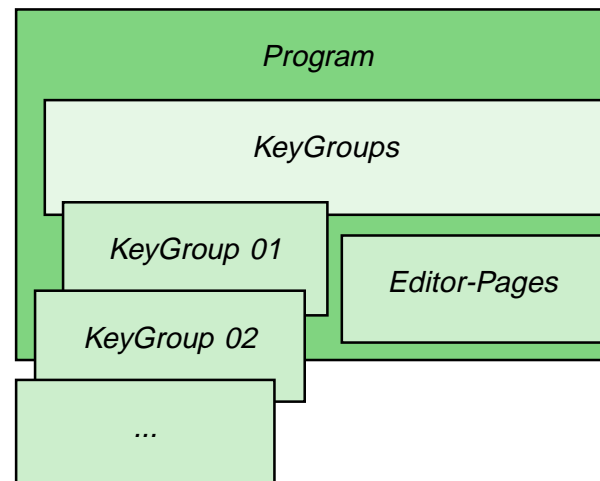
## Program Pool

The Program Pool stores references for up to 999 configured programs. Of these, you can use the first 128 with MIDI Program Change to enable automatic program switching from a sequence (programmed) or a keyboard (real time). The Program Pool features its own Preset list, allowing you to store composition-specific or generic (e.g. General MIDI) program pools.



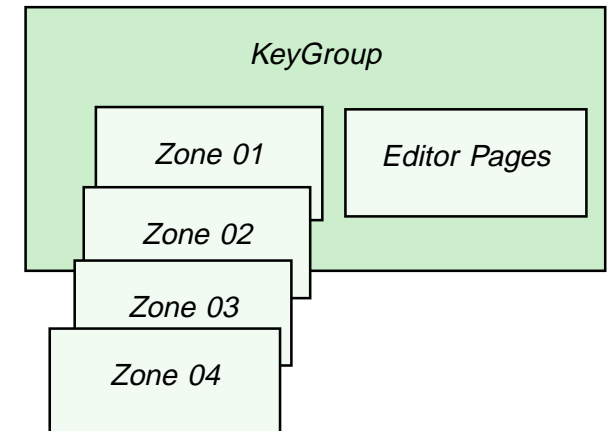
## Programs

Each program must contain at least one Key Group. A key group defines the keyboard range over which the sample will play, and can extend from a single key to the entire MIDI range. Key groups are used to help create authentic sounding instrument imitations, or to organize related samples such as drum or percussion sets, or perhaps sound effects. For synth-type sounds a single sample is often spread over the entire keyboard range.



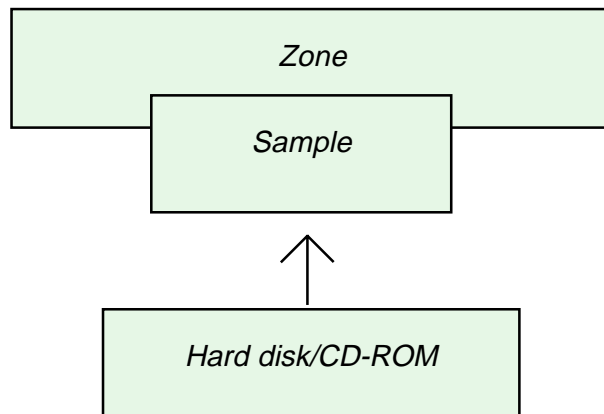
## KeyGroups

Each key group stores up to 4 different samples, each in its own 'zone'. The samples per se are not stored - only the play parameters and references to the sample paths are stored with the program. A zone contains such information as the volume, pan and envelope settings with which the sample is played back.



## Zones

Each key group contains four Zones, each of which can reference one sample. Here it is possible to override certain sample playback parameters without editing the reference sample directly. Zones are used primarily for two things: to implement velocity-switching and for stereo sample playback. Velocity switching allows for up to four different velocity ranges to be defined, each with its own playback parameters and/or sample. Stereo samples can use zones to separate left and right channels. For example, the left channel of a stereo .wav file could be assigned to zone 1, and the right to zone 2.



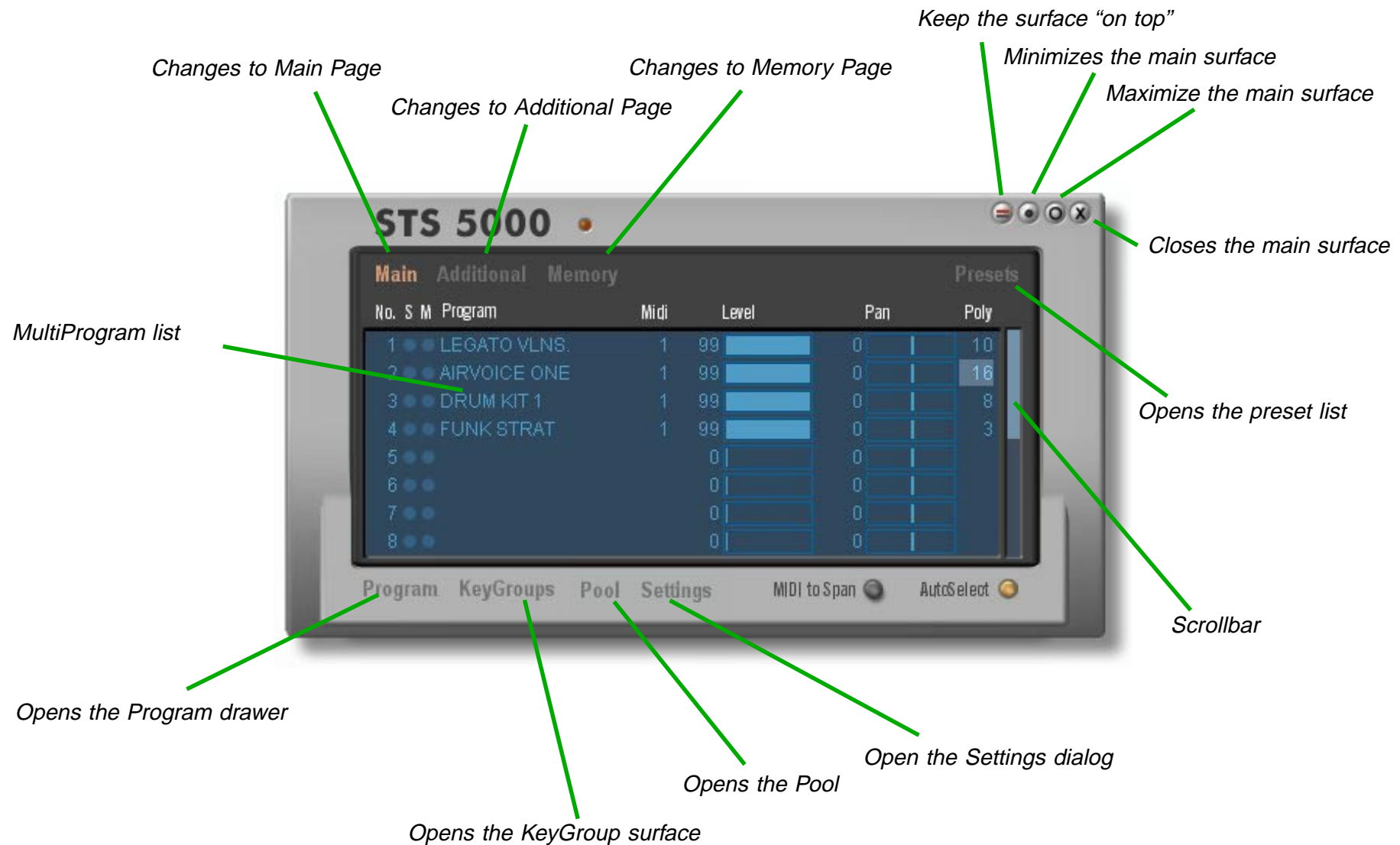
## Samples

Samples contain the actual sound information. A sample is digitized audio which resides either on an external drive (which may also be a CD-ROM) or directly on the hard disk inside your computer.

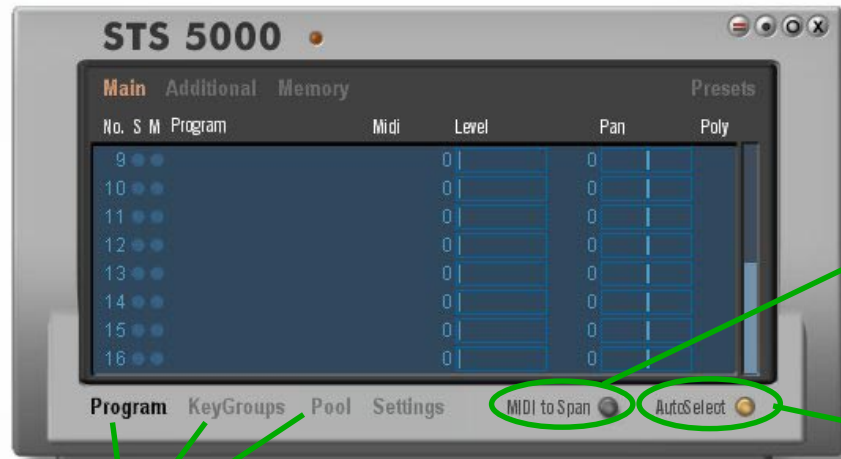
The STS 5000 understands the following sample formats in addition to its own: WAV files (file extension 'wav'), S files (Akai format, extension .s) and AIF files (extension .aif).

Regardless of the format, a sample is loaded into a zone 'by reference'. This implies that any changes made to the sample itself will affect any program that uses it. You should be very careful, therefore, when making changes (such as 'destructive' editing) to the original sample. The STS 5000 uses the zone and program information (such as the start inset) during sample playback, without changing the original sample file, so destructive editing of the sample itself is not often necessary.

# The Main Panel



This section describes the usage and operation of the Main Panel and its Multi Program List window.



**Program:** Opens the **Program** drawer. Here you will find additional program-specific parameters.

**KeyGroups:** Opens the **KeyGroupList** panel containing a list of the key groups for the selected program.

**Pool:** Opens the **ProgramPool**.

**Settings:** Opens the Settings dialog. External MIDI controller assignments can be made here by assigning the desired MIDI controller numbers to the ten controllers. In addition, the master gain of the STS 5000 and the global level of the individual outputs (IO Gain) can be adjusted here.

**MIDI to Span:** Some parameters require a MIDI note value, such as when you are defining a keyboard range. In these cases you can enter the value by striking the appropriate key on a MIDI keyboard. Click on **MIDI to Span** to enable or disable this option. The switch will glow yellow when the option is enabled.

**AutoSelect:** This option, when enabled, synchronizes the Main Panel, the KeyGroup panel, and the Sample Editor. When you select a program in the multi program list, the associated key group and sample will be automatically updated in their respective panels. You can switch this option off when you are not editing programs in order to speed up the response in the multi program list. Enable or disable this option by clicking on the round **AutoSelect** switch. It will glow yellow when enabled.



# MultiProgram List

## Main

You can configure up to 16 independent programs in the Multi-Program List. Each program occupies one line, or 'slot', in the list. In addition to the name of the program, each slot contains several other columns of parameters to control sample playback. The complete set of parameters is divided into two sections - **Main** and **Additional**.

**No. (1 - 16):** Indicates the number of the program.

**S (Solo):** Click on a program's **Solo** column to mute all other instruments. The soloed program only will remain active.

**M (Mute):** Click on **Mute** to disable an instrument.

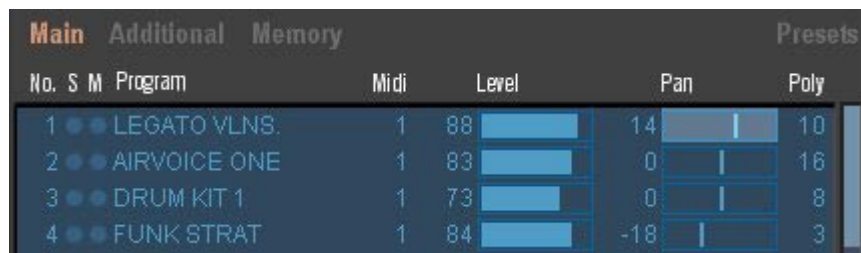
**Program:** Indicates the name of the loaded program. You can change the name; select the program, type in a new name, and confirm by hitting <Enter>. If you've typed in a new name, but change your mind, hit <Esc> to recall the original name.

**Midi:** Selects this program's MIDI channel. This is the same parameter as the one found in the **Channel** field on the **MIDI** page in the **Program** drawer.

**Level:** Controls the volume of this program in the stereo mix output. You can adjust the value using either the text field or the associated fader/indicator.

**Pan:** Controls the left/right pan in the stereo mix. You can adjust the value using either the text field or the associated fader/indicator.

**Poly:** Sets the maximum polyphony with which the program can be played.



Main				Additional	Memory	Presets	
No.	S	M	Program	Midi	Level	Pan	Poly
1	●	●	LEGATO VLNS.	1	88	14	10
2	●	●	AIRVOICE ONE	1	83	0	16
3	●	●	DRUM KIT 1	1	73	0	8
4	●	●	FUNK STRAT	1	84	-18	3

Detail of the MultiProgram list

## Additional

**IOut (individual out):** Because of the complex architecture of the STS 5000, an explanation of this parameter is required to understand it fully. Note that the value as set here does not necessarily correspond to the individual output with the same number. For one thing, some programs contain stereo samples, which occupy two outputs. And it gets even more complex with drumsets, for example, where each key may be assigned to a particular output via key groups. In general, it is best not to associate the IOut setting too firmly in your mind with the audio outputs on the module.

Main			Additional	Memory	Presets				
No.	S	M	Program	IOut	Ind. Level	Trans.	L-Key	H-Key	Priority
1	●	●	LEGATO VLNS.	Off	50		0	C0	G8 Norm
2	●	●	AIRVOICE ONE	Off	50		0	C0	G8 Norm
3	●	●	DRUM KIT 1	Off	50		0	C0	G8 Norm
4	●	●	FUNK STRAT	Off	50		0	C0	G8 Norm

*Individual outs of the zones (samples)*

What is IOut then?

Each zone (sample) in a key group is associated with a particular output. This output is assigned in the **Zone** page of the **KeyGroupList** panel's **Options** drawer under **Add. - Out**. This allows you to isolate, for example, a snare drum on its own output, separated from the other drum kit samples.

In this example, the snare is set to Out 1. The snare will play through the first output, as long as the program's IOut is adjusted to Off. If **IOut** is set to 1, the

snare will play through output number 2. Thus the **IOut** setting can be considered to be an offset to which will be added the individual **Out** values. This scheme lets you shift a program's outputs in parallel, all at the same time, by simply changing the offset.

**Ind. Level:** Controls the playback level of the program's individual outputs. Enter values using the fader, the field's 'text-fader' capability, or by entering them directly into the field from the keyboard.

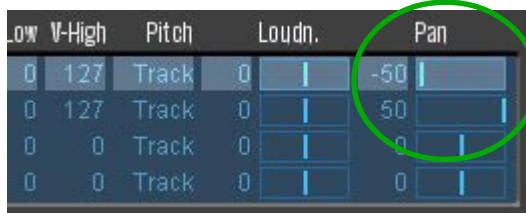
**Trans.:** Transposes the program's pitch up or down by up to +/-50 semitones. Adjust the value using the textfader, or by entering the value from the keyboard.

**L-Key / H-Key:** Defines the fixed keyboard range within which the program will respond; e.g. the comfortable or appropriate range of a multi-level split sound setup (this could be the actual range of a real instrument). Enter the values using the textfader field, or directly from the keyboard. When entering the values directly, you can use note names, such as C#4, or MIDI note numbers (i.e. 73). If **MIDI to Span** is enabled, you can also use a MIDI keyboard to enter values.

**Priority:** Enter the priority weighting for the voice allocation algorithm. When available voices are at a premium, high priority programs will be favoured over lower priority programs. Enter the priority value using the textfader, or directly from the keyboard. The settings here correspond to the setting of the same name in the Program/MIDI page.

## Using Individual Outs (an Example)

A stereo sample contains two samples, each occupying one of the first two zones in the key group: zone 1, left channel; zone 2, right channel. The proportion in the L/R mix is determined by the pan settings. **IOut** is set to Off.



Low	V-High	Pitch	Loudn.	Pan
0	127	Track	0	-50
0	127	Track	0	50
0	0	Track	0	0
0	0	Track	0	0

KeyGroup List - Options - Main

To play this program through two individual outputs:

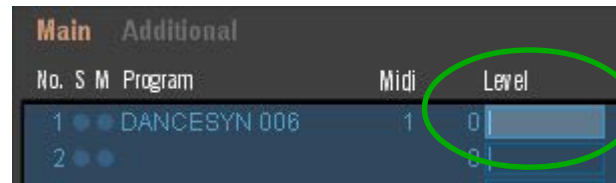
Enable the **Edit All** option on the KeyGroupList panel so that your editing will affect all zones in parallel. Change the **Out** values for zone 1 to output 1, and zone 2 to output 2.



Tune	Filter	Out	Playback	VelStart
0.00	0	1	As sample	0
0.00	0	2	As sample	0
0.00	0	Off	As sample	0
0.00	0	Off	As sample	0

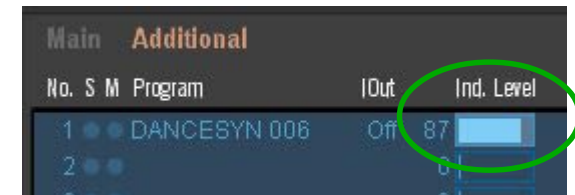
KeyGroup List - Options - Add

The program is now set to produce output at the stereo mix outputs, and also at the individual outputs 1 and 2. To remove the program from the mix outputs, set the **Level** (main panel - **Main**) to 0.



No.	S	M	Program	Midi	Level
1	●		DANCESYN 006	1	0
2	●				0

Main Panel - Main



No.	S	M	Program	IOut	Ind. Level
1	●		DANCESYN 006	Off	87
2	●				

Main Panel - Additional

Now you can set the levels for the individual outputs using the **Loudn.** text fader in the zone page (Main).

The **IOut** is set to Off. When this is off, the audio is routed to the outputs as set by the Out values in the key group. If you now set **IOut** to 2, for example, the program will output audio on the number 3 and 4 outputs. The actual outputs are determined by adding the Out values to the IOut value.

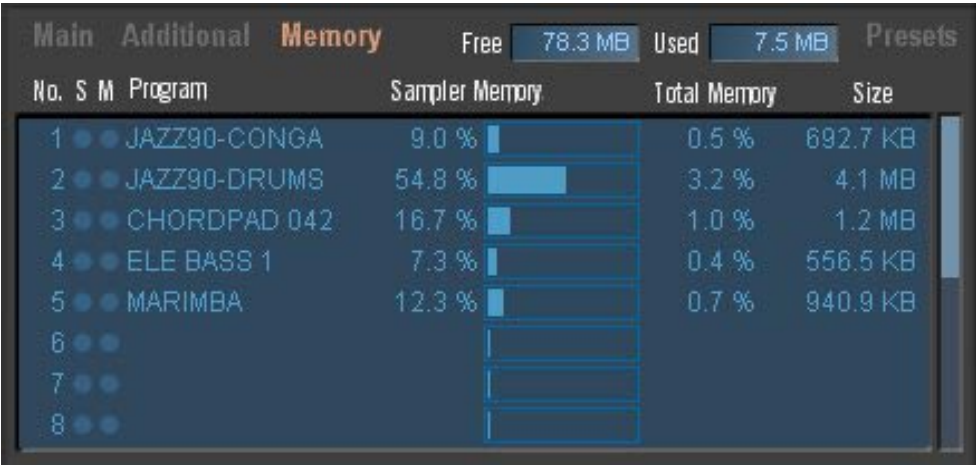
# Memory Page

The Memory Page provides technical information regarding the current memory usage. This lets you monitor available and used memory, and helps you maintain an overview of memory usage in large multi programs in which you may want to exchange certain programs to free up additional memory.

**Sampler Memory:** This value indicates the memory usage of a program relative to the memory usage of all programs. You can quickly see which programs are the memory hogs. The bar at the right serves as a visual aid.

**Total Memory:** This value shows the memory consumption of a program in relation to the overall physical memory.

Overall memory is, of course, also used by the Sampler software itself and all other applications.



**Size:** Indicates the size of the sample and program data of a program.

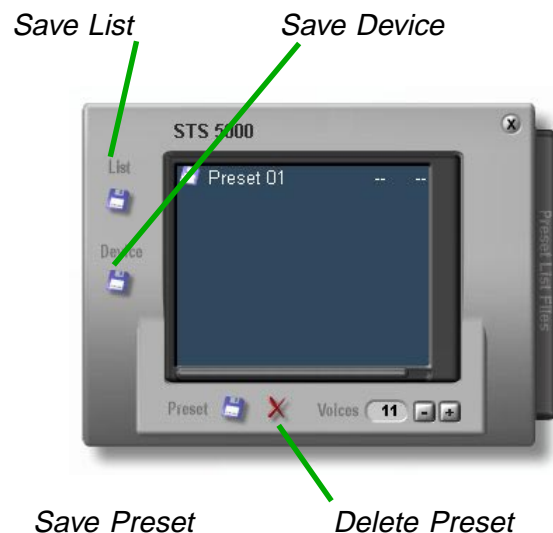
**Used:** The total memory usage of all loaded samples and program data.

**Free:** The maximum amount of memory remaining for sample use.

Remember that as free memory becomes smaller and approaches zero, the overall system performance will suffer as more data is moved to virtual memory on the hard drive.

# Preset List

The STS 5000 lets you store all the values contained in a multi-program list as a Preset. When you load a preset, all programs that were present when the preset was stored will be loaded. The individual program parameters themselves are not saved with a multi preset - only a reference to the program is saved. Changes in programs or samples must be stored separately.



## Recalling Presets

Doubleclick on a Preset to recall it. You can also select one from the list using the arrow keys, and recall it by hitting <Enter>.

## Creating an New Preset

To initialize a new Preset, click on the diskette icon labeled **Preset** to add a new preset named 'Untitled' to the list. Enter a name, and confirm the new name by clicking with the mouse on a blank line in the list, or by hitting <Enter> on the keyboard. On confirmation, the new entry will immediately take its place in alphabetical order in the list.

A new entry in the list is shown with a 'diskette' icon preceding its name. This indicates that it has not yet been saved with the STS 5000. To ensure that the preset will be saved for the next session, click on the store **Device** button (the diskette button icon labeled 'Device').

## Renaming Presets

You can rename a preset at any time. Select the appropriate preset and hit the <F2> function key (or click once more on the preset name). The preset entry will change to text edit mode. Edit the name as desired and hit <Enter> to confirm.

## Deleting Preset

To remove an obsolete preset, select it and click on the delete button (red 'X') or hit the <Delete>/<NumLock> key on the keyboard. The deleted preset is displayed with a trash can icon to indicate that it will be removed from the list when the list is closed. To ensure that the preset will remain deleted for the next session, click on the store **Device** button as above.



## Overwriting a Preset

Select the preset to be updated and click on the **Preset** button. When the confirmation dialog appears, hit the <Enter> key or click on the **Yes** button in the dialog. To ensure that the preset will be permanently overwritten, click on the store **Device** button.

## Saving a Preset List

Use **Save Preset List** to permanently save the current Preset List as a file to disk. Click on the diskette icon button labeled **List**.

## Saving the Device

Use the **Save Device** feature to save the STS 5000, including all changes made to the Preset List, to disk. This is necessary to ensure that all changes will be saved permanently.

## Opening an additional Preset List

You can open a second Preset List by opening the PresetListFiles drawer and clicking on the folder icon button named 'List'. This brings up a file selector dialog in which you can select a preset file to open. After you open a preset list, its name and path appears at the top of the drawer, and the list of available presets appears in the list window. Double-clicking on a preset in this window makes it current (activates it).

**Important:** If you delete a Preset from this list, it is also permanently removed from the file.

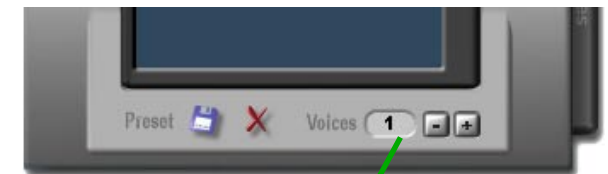
You can drag and drop a preset from the secondary list into the main list. It will be loaded into the main preset list, but not permanently saved until you click on the **Device** button.

## Polyphony

An important parameter is the **Voices** setting, which determines the maximum number of voices available. This setting is global for the device, and not specific to any preset.

Change the voice allocation with the small 'plus' and 'minus' buttons, or by using the field's textfader capability. The maximum number of voices available to the STS 5000 is 64. However, this high capacity can only be allocated if there are no other devices or modules loaded into the project that use DSP resources.

The number of voices set here is distributed dynamically among the programs according to their priority levels as set in the multi-program list.



Number of Voices

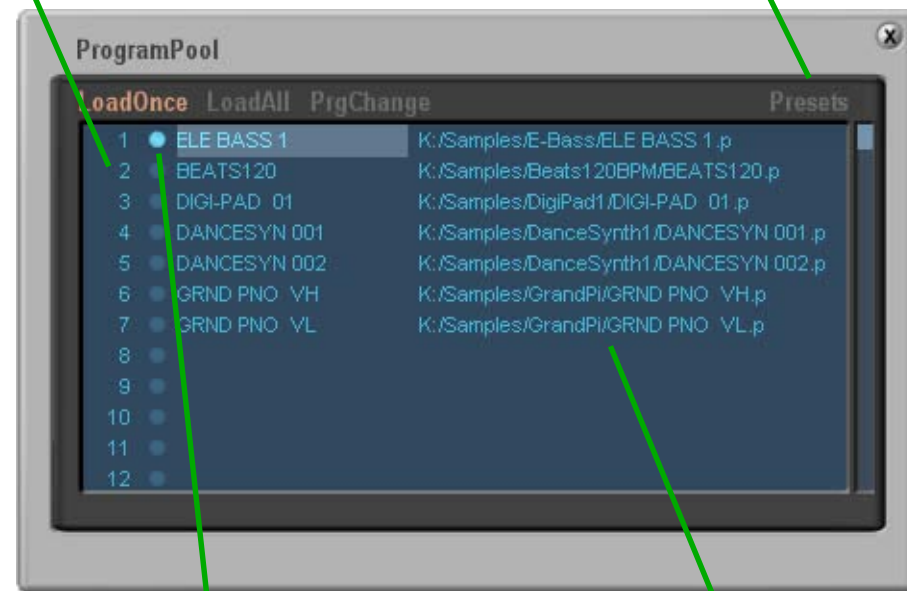
# Program Pool

The STS 5000 features a ProgramPool in which you can organize your programs for MIDI program change assignments, or simply to help manage them efficiently. The pool accepts up to 999 programs which can be distributed across various directories and drives throughout your system. Use this feature to create catalogs of instruments, such as all pianos, percussion etc. Organizing your programs this way allows you to quickly audition all your pianos, for example, without having to traverse multiple directories across multiple drives to do it. (The pool knows to use the two Sample Players for auditioning purposes.) Since the first 128 positions in the pool list are addressable by MIDI program change, you can organize pools to allow the STS 5000 quick access to your most important programs via MIDI program change commands.

Click on **Pool** on the main panel to open the Program Pool. You can alter the pool's window size by dragging the bottom or right edges while holding the (left = PC version) mouse button, or you can resize the window in both directions at once by dragging the lower right corner of the window.

*Program Change Number*

*Opens Pool Preset List*



*Program in Memory*

*Path Name*

**Load Once:** When enabled, **Load Once** maintains a program in memory after it has been removed from its multi-program slot. This allows programs to be subsequently re-loaded very quickly. This feature is most effective in a system with sufficient memory.

**Load All:** Enable **Load All** to put all programs in the pool into the PC memory. You should have sufficient RAM to use this feature. This permits the quick loading of programs into the multi-program slots using MIDI Program Change commands - including the first time they are loaded.

If you have not enabled either **Load Once** or **Load All**, only the programs in their respective multi slots are actually loaded into memory. You must therefore allow for the time it takes to load programs from the pool into the multi-program list when using MIDI program change.

When a program is in memory the blue LED next to its name will glow.

Another convenience the pool provides is to let you drag and drop a sample from the pool directly into a slot, just as you can from the File Browser.

**PrgChange:** To prevent MIDI Program Change commands from unintentionally confusing things in your setup, you have the option of turning it off. Enable **PrgChange** only when needed.

**Presets:** Click on **Presets** to open or close the Preset list.

# Using the Pool

Programs in the Pool list are actually links, or references to programs in memory or on disk. The terms ‘program’ and ‘link’ are used somewhat interchangeably below.

## Adding Links

Drag a program from the File Browser into the pool to add it to the list. The program link will be inserted at the position at which you drop it. If another program exists in that position, it will be replaced.

## Moving Links

You can move a program to a new position in the list by dragging it from its old location to a new location (e.g. to change its MIDI program change assignment). If you move a program to a position that is already occupied, the new program will replace the existing one.

You can also change the position of a program link by clicking on its line number and entering the new position numerically

from the keyboard. This is helpful when the new position is not currently visible. If a program already exists in the new position, you will be prompted to replace it or not.

## Deleting Links

To delete a program link, select it and hit the <Delete>/<NumLock> key. To delete all links in the list, right click anywhere in the list to bring up the context-sensitive menu, and select **Clear**.

## Changing a Directory Path

Sometimes a link will no longer function because the original program has been moved to a new location in your system. When this happens, the text ‘<invalid path>’ appears in the Name field. You can ‘fix’ this manually by selecting the path field and pressing the <F2> function key to enter edit mode.

To move several links together to a common directory, hold the <Shift> key while confirming with <Enter>.

## Using the Preset List in the Program Pool

The STS 5000’s Program Pool has its own Preset list to organize and maintain multiple pools. Use this capability to maintain, for example, a General MIDI (GM) pool, or song-specific pools, or to organize programs, possibly spread throughout your system, into various categories.

**Important: Changes to the Preset List are saved only when the Device itself is saved. This means that you must store the STS 5000 in an STS 5000 preset to ensure that the pool presets are not lost.**

Functionally, the pool’s preset list operates as other normal preset lists.

# Program Parameters

This chapter describes the settings contained in the various Program pages. These pages are accessed via the Program Drawer by clicking on the corresponding labels (e.g., **Soft** – see diagram at right), which change color from gray to black when the associated page is opened.

First, a few words on the logic of the STS 5000 modulation interconnections, and the various possibilities this design opens up.



*Current page*

*More pages*

*Parameter area*

# The Modulation Matrix

The STS 5000 features a flexible routing matrix by which different modulation sources (LFOs, Aftertouch, etc) are routed through various parameter controls. A modulation source is always defined for the entire program, but the intensity can be adjusted by different parameters in different locations. For example, Pan Modulation is a single parameter that applies to the entire program, and can be adjusted only at one point. Pitch modulation, however, can be adjusted per key group.

## Modulation sources

**No Source:** Null - no modulation source.

**Modwheel:** MIDI modulation wheel.

**Bend:** MIDI pitchbend wheel.

**External1-10:** Any other MIDI controller. Set the desired controller number on the Settings dialog.

**Velocity:** MIDI note velocity.

**Key:** Modulation influenced by MIDI note number.



*Modulation Sources*

*Modulations Intensity*

To assign a modulation source, use the textfader function. Move the mouse until the desired source appears in the text field. Release the mouse button to assign the new modulation source.

**LFO 1:** Low Frequency Oscillator 1.

**LFO 2:** Low Frequency Oscillator 2.

**ENV 1:** ADSR envelope.

**ENV 2:** Multi-stage envelope.

**!Modwheel:** The value of the modwheel at the instant that a key is played.

**!Bend:** The value of the pitch bend wheel at the instant that a key is played.

**!External:** The value of the external MIDI controller at the instant that a key is played.

## Fixed MIDI Modulation Assignments

There are several pre-defined, non-alterable MIDI modulation assignments which permit control of specific parameters without any further adjustments.

Ctrl no.	Modulation destination
7	Volume
10	Pan
11	Expression
67	Softpedal
70	CutOff
72	Release
73	Attack



# Loudness-Page

## Basic Level

This parameter controls the loudness of the associated program. It is intended to permit an initial balancing of volume among a set of programs of differing volume levels. Subsequently, the Level parameter (in the Multi-ProgramList) can be applied in order to achieve the desired level mix of the programs in use.

Another important use of the **Basic Level** control is to avoid distortion due to overloading. When several modulation sources and perhaps also a resonant filter are used at the same time, the level of the combined result may become too high and lead to clipping. If this occurs, you can remedy the problem by lowering the Basic Level.



## Volume Modulation

Three modulation sources for program volume are provided. The assignment to MIDI note velocity (**Vel**) is fixed. The other two can be freely selected from among the sources available in the modulation matrix.

The intensity of an additional selectable modulation source can be controlled separately by key group. Adjust this setting in the KeyGroupList panel's Option drawer under **Global**.

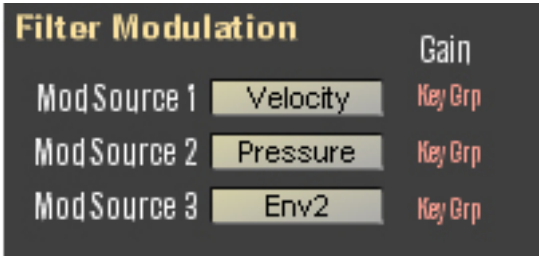
## Pan Modulation

The program's pan position can be modulated by three selectable sources.

# Filter Page

## Filter Modulation

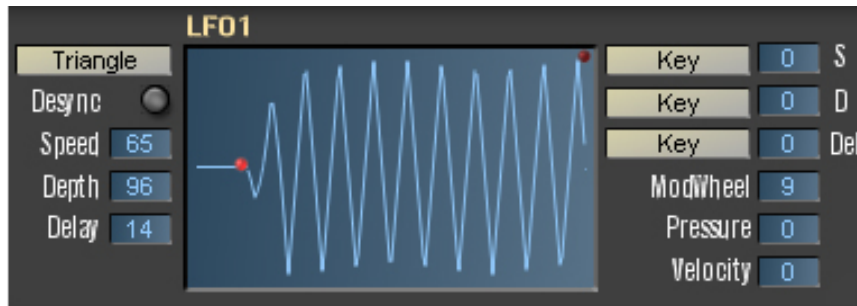
The three freely selectable modulation sources (ModSource 1-3) apply to all key groups in a program. However, the amount of effect for each source can be set separately for each key group (KeyGroupList/Options drawer/**Filter**).



Filter page of the program drawer

## LFO 1 Page

The STS 5000's LFO 1 serves not only as a modulation source; it, itself, can also be modulated. This opens up some possibilities for very complex modulations.



**Waveform:** Select the desired modulation waveform (triangle, sawtooth, square or random) in the shaded textfield in the upper left part of the page. Click on the field, and move the mouse vertically until the name of the desired waveform appears. Then release the mouse button.

**Desync:** LFO 1 normally modulates each voice synchronously. Enable **Desync** to defeat this, so that each voice is modulated independently.

**Speed:** Sets LFO frequency.

**S, D, Del:** Speed, Depth, and Delay can each be modulated by a selectable source.

**Depth:** Controls the amplitude range of the LFOs to a maximum modulation strength of 99 (range = 0..99).

**Delay:** Sets the length of time from the note-on event until the modulation starts. The modulation effect fades in smoothly.

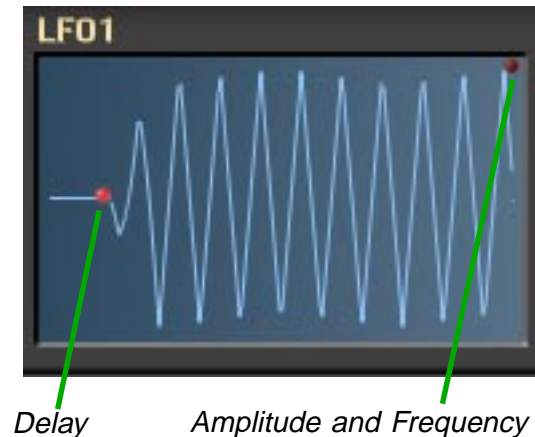
**MCik:** When this option is activated, LFO speed is coupled to that of an incoming MIDI clock stream. In the text fader at right, you can specify the desired clock divide value. A divider value of 24/12 results in an LFO speed corresponding to one eighth-note, 24/24 yields quarter-note tempo, 24/48 corresponds to half-notes, etc.

### ModWheel, Pressure, Velocity

Each of these three fixed-assignment modulation sources can be used to further increase the strength (amplitude) of the modulation signal.

## Waveform Display

This window displays the LFO's current settings, and provides a graphical interface with which you can edit them.



**Delay:** Click on the red 'point' on the left and drag it horizontally to adjust the delay parameter.

**Amplitude:** Click with the mouse button on the red 'point' on the right and drag it vertically to adjust the amplitude.

**Frequency:** Click on either red 'point' with the right mouse button ('Ctrl'+ mouse button in Mac OS) and move the mouse horizontally to adjust the frequency.

## LFO 2 Page

### Waveform:

Select the desired modulation waveform (triangle, sawtooth, square or random) in the shaded textfield in the upper left part of the page. Click on the field, and move the mouse vertically until the name of the desired waveform appears. Then release the mouse button.



**Retrigger:** When **Retrigger** is enabled, each note-on event (key strike on the MIDI keyboard) triggers a new start of the modulation cycle. With retrigger off, the LFO continues uninterrupted when new notes are played.

**Speed:** Sets LFO frequency.

**Depth:** Controls the maximum possible range of the depth of the LFO modulation - adjustable from 0..99.

**Delay:** Sets the length of time from the note-on event until the modulation starts. The modulation effect fades in smoothly.

**MCik:** When this option is activated, LFO speed is coupled to that of an incoming MIDI clock stream. In the text fader at right, you can specify the desired clock divide value. A divider value of 24/12 results in an LFO speed corresponding to one eighth-note, 24/24 yields quarter-note tempo, 24/48 corresponds to half-notes, etc.

### Waveform Display

This window displays the LFO's current settings, and provides a graphical interface with which you can edit them. Its usage is identical to the **LFO 1** display (see above).

## Pitch Modulation Page

Here you adjust the characteristics of the pitch modulation. All parameters apply to the program overall.

**Tune:** Controls the overall tuning of the program. The left field is adjustable in semitones (+/- 50) and the right in cents (0..99).



**ModSource:** Select one of the selectable modulation sources. The intensity of the pitch modulation is adjusted for each key group in the KeyGroupList panel's Options drawer under **Global**.

**Pressure:** You can use MIDI channel Aftertouch values to raise or lower the pitch (range = +/- 12 semitones).

**BendWheel Up:** Controls the maximum positive pitch deflection when the pitchbend wheel is moved up (range = 0..24 semitones).

**BendWheel Down:** Controls the maximum negative pitch deflection when the pitchbend wheel is moved down (range = 0..24 semitones).

**Mode:** In **Normal** mode the pitchbend wheel modulates all notes currently in play. In **Held** mode, only new note-on events will respond to the wheel. Subsequent pitch wheel activity will have no effect until a new note is played.

## MIDI Page

**Channel:** Sets the channel used to address the program. This parameter corresponds to the MIDI Channel setting in the multi-program list.

**Transpose:** Sets the transpose value by which incoming MIDI notes will be adjusted up or down in pitch (+/- 50 semitones). This parameter corresponds to the Trans. Value in the multi-program list.

**PrgNo.:** The program number here is a value originating from AKAI programs. For use with the STS 5000 this value has no real meaning, as program switching is implemented by MIDI Program Change.

**Lowest Key, Highest Key:** The values set here are identical to the corresponding settings in the multi-program list. They define the overall keyboard range for the program.

**Polyphony:** Sets the maximum number of voices for this program.



*These settings apply to the overall program.*

**Priority:** Indicates the voice allocation priority level setting for the selected program. Note that this setting is identical to the setting of the same name in the multi-program list.

The available priority settings include **Low**, **Normal**, and **High** as well as **Hold**. When a new note is played under a **High** priority program, and all sampler voices are already in use, the **High** priority program will first attempt to 'steal' or recycle a voice which is playing a **Low** priority program. If there are no such voices, it will look for a voice which is playing a **Normal** priority program. As a last resort, if all voices are already allocated to either **High** priority or **Hold** priority programs, it will steal a voice which is playing a **High** priority program. **Normal** priority programs, in turn, may steal voices from **Low** or **Normal** priority programs, in that order, but never from **High** priority

programs, while **Low** priority programs can steal voices only from other **Low** priority programs.

**Hold** not only indicates higher priority than the other three settings, but also that voices will never be 'stolen' from this category, even by other **Hold** priority programs.

Judicious use of priority settings can produce dramatic improvements in the musical results obtained – for example, by assigning **Low** priority to short, often-repeated sounds such as snare and hi-hat, which can be cut off before they end without producing noticeable 'absences', or High priority to floor toms and ride or crash cymbals, which will sound markedly unnatural if cut off prematurely, or Hold priority to sounds (bass, piano, gongs, speech samples) whose voices should never be stolen.

**Reassign:** Here you specify an option for which note will be stolen when all notes are already in play. **Oldest** selects the note that has been playing the longest to switch off. **Quietest** selects the note playing at the lowest volume level.

**Mono / Legato:** This option, when enabled, puts the sampler into 'Mono' mode, in which it behaves similarly to early synthesizers. In this mode, if you strike a new note before releasing an existing one, the pitch will shift to the new note, but the note will not be retriggered.

The effectiveness of this option is limited somewhat by the key group ranges. Depending on the configuration, larger intervals may produce unpleasant results if a key group boundary is crossed in mono mode.

## Tuning-Page

This page lets you set up differently tempered tunings for the program.

Each semitone step can be detuned by up to +/- 25 cents (hundredths of a semitone). Therefore, adjustments of up to 1/8th tone up or down are possible. Tuning adjustments apply to all octaves.



**Shift Root Key:** The default root, or tonic key for an alternate tuning is C. As most alternate tunings are key-specific, you will often want to establish a tuning in a key other than C. To shift the tuning from C to C#, click on **Shift Root Key** once. To shift from C to D, click it twice.

## Midi2-Page

### Soft Pedal

'Soft Pedal' refers specifically to MIDI Controller #67, typically used to 'soften' the sound. This page lets you adjust the precise effect of this controller on a program. The adjustment range in each field is 0-99, where 0 means no effect and 99 means maximum effect.



**Attack Stretch:** The Soft Pedal causes attack times to be extended to a greater or lesser extent (i.e. attacks become slower with higher values).

**Loudness Reduction:** The Soft Pedal reduces the overall loudness to a greater or lesser extent.

**Filter Close:** The Soft Pedal lowers the filter cutoff frequency to a greater or lesser extent.



## Sample Trigger Mode

Here you can choose among trigger modes which include extended options appropriate for use with pitch shifting and formant correction.

**Standard:** This is the “normal” playback mode which exists in every sampler. Each key (or voice) triggers a new sample.

**Auto Chord:** The first key played triggers a voice which performs normal playback of the appropriate sample. If another key in the same keygroup is now played, it triggers its own new voice (with corresponding envelopes, modulations etc.) – however, the new voice in effect “joins in” with the playback of the first voice, picking up from wherever the first voice happens to be at that moment.

As an example: You’ve sampled a choir voice and want to harmonize it via the keyboard. Therefore, you’ve already performed sample analysis and selected Formant mode. Via the Track option, the sample pitch is controlled by the keyboard. Thus, the sample will be transposed according to the key you play it with, but will play at constant speed over all keys, with appropriate formant correction. When you play the first note,

a voice starts. Play additional notes during the sections you wish to harmonize. The new notes don’t trigger new samples of their own, but merely add further transposed voices playing the same sample in lockstep.

**This continues for as long as you hold at least one key down (legato). Once you release all keys, the next new key retriggers the sample from the start.**

**Remote Chord:** This mode is largely similar to the Auto Chord mode described above. The first key played triggers a voice and a sample, while additional keys in effect merely harmonize the first voice.

In contrast to Auto Chord mode, however, this mode requires that sample triggering first be “armed” via a designated keyboard key (typically outside the keygroup) or any desired MIDI controller. Once it is armed, the sample begins playing as in Auto Chord mode and continues to play without restarting for as long as the “arm” key is held (or as long as the “arm” controller remains above the specified threshold), but is heard only when non-“arm” keys are

played. Thus, in this mode you don’t need to play legato in order to avoid restarting the sample. This can simplify the playing – for example, when you wish to change from one chord to another, and the two chords have no notes in common.

**Note:** Here, specify the note which “arms” sample triggering.

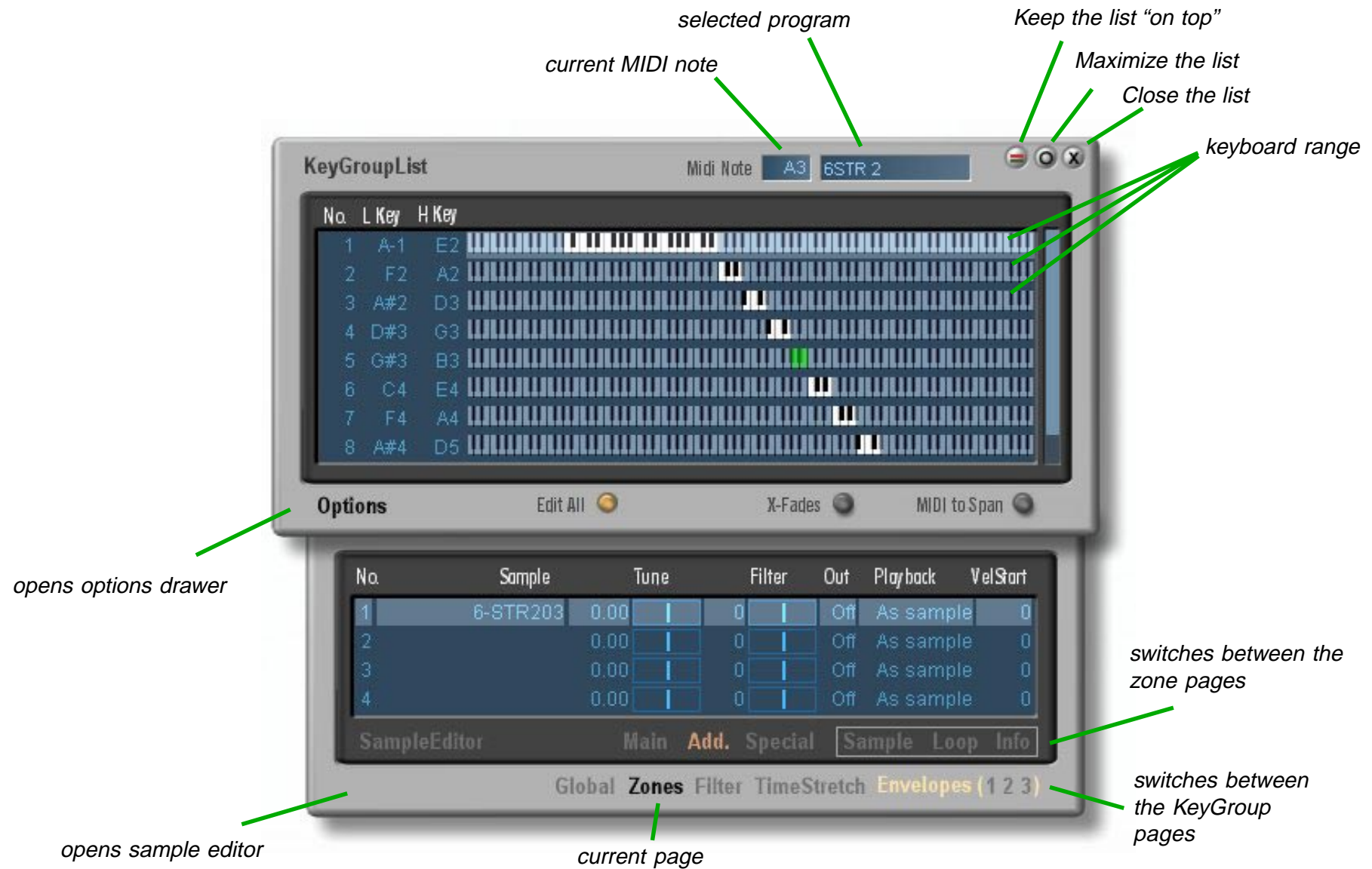
**If you don’t want the trigger key to also produce audible playback, select a note which is outside the Keygroup.**

**Ctrl:** Specify the number of the MIDI controller you wish to use to “arm” sample triggering.

**Thresh.:** Specify the MIDI controller value above which sample triggering is to be “armed”. When the controller value falls below this threshold, all voices are stopped.



# The KeyGroupList Panel



## The KeyGroupList

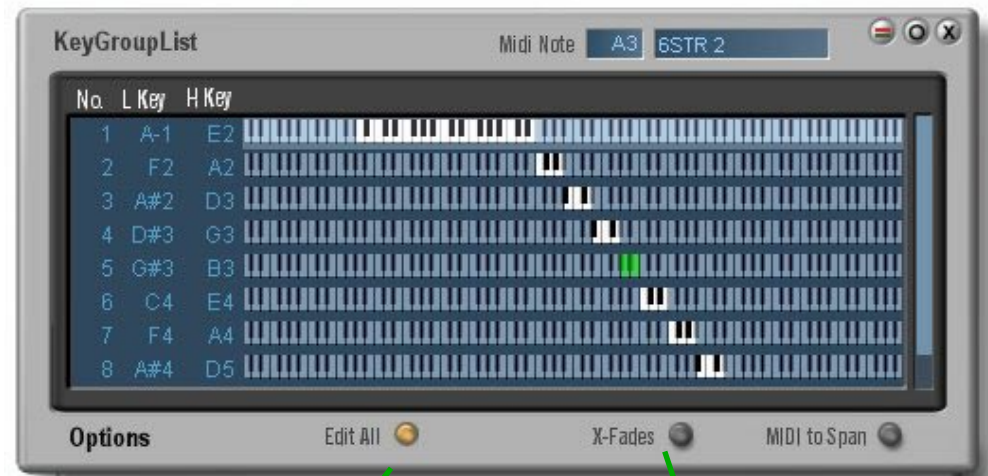
The Key Group List displays all of a program's key groups. To help visualize the MIDI assignments, active MIDI ranges are colored green. Each key group is defined by the following three values:

**No.:** Number of the individual key group.

**L Key:** **L Key** specifies the lowest note of the key group. To change this value, click and hold the mouse button on the value and drag the mouse to the right (to raise the note) or to the left (to lower the note). You can also enter the key value directly from the keyboard using either the note number (0..127) or the note name (C0 to G10). Finally, you can use a MIDI keyboard to enter the value if **MIDI to Span** is enabled on the main panel.

**H Key:** **H Key** sets the corresponding highest note defining the range. Adjust this value as described above for **L Key**.

## Additional Control Elements



**Edit All:** Enable **Edit All** to make the Env1 and Env2 settings in the **Options** drawer apply to all key groups. The individual key group settings will be overwritten.

Likewise, changes made to the Main and Add key zone parameters will be transferred to the respective zone in all key groups. For example, if you change the individual output for a zone 1 sample, all zone 1 samples will be adjusted to this setting.

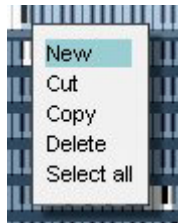
**X-Fades:** Enable **X-Fades** to blend (mix) samples during the transition from one key group to another within the range where they overlap.

Bear in mind that enabling this option implies a reduction in voice polyphony, as two voices are required during the transition.

**MIDI to Span:** In certain spots, the STS 5000 expects MIDI note numbers as parameter values – for example, to define a keyboard range. When **MIDI to Span** is active (the button lights up yellow), these values can be entered directly from the keyboard by playing the corresponding keys.

# Using the Key Group List

## Adding a New Key Group



Select **New** from the context-sensitive Key-GroupList menu (or use the keyboard alternative, <Ctrl+N>/<Apple+N>) to initialize a new key group and add it to the list.

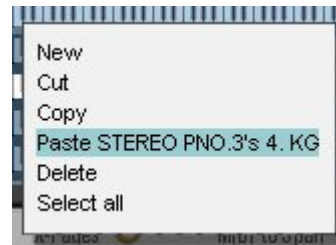
If you drag a sample directly into the Keygroup list, a keygroup is automatically created which initially spans only the original key of the sample. With stereo samples, two zones are created, and the Channel and Pan parameters are set as appropriate.

If you drag a folder which contains samples into the Keygroup list, keygroups will be created automatically for all samples. Each of these keygroups initially spans only the original key of its sample.

## Cutting a Key Group



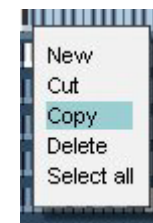
Use the **Cut** entry in the context-sensitive menu (or the keyboard equivalent, <Ctrl+X>/<Apple+X>) to remove a selected key group from the list.



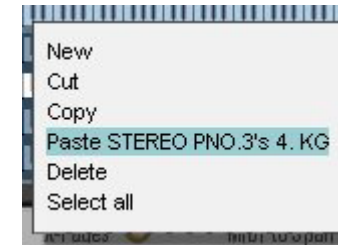
The key group is copied to a buffer, and can be inserted using **Paste** (<Ctrl+V>/<Apple+V>) into another location, even to another program.

Multiple keygroups can be cut at the same time by first selecting them using the mouse or via **Select All**.

## Copying a Key Group



Use the **Copy** entry in the context-sensitive menu (or the keyboard equivalent, <Ctrl+C>/<Apple+C>) to copy a selected key group in the list.



The key group is copied to a buffer, and can be inserted using **Paste** (<Ctrl+V>/<Apple+V>) into another location, even to another program.

Multiple keygroups can be copied and inserted at the same time by first selecting them using the mouse or via **Select All**.

## Deleting KeyGroups

Use **Delete** to delete selected keygroups. You can also do this using the <Delete>/<NumLock> key. Multiple keygroups can be deleted at the same time by first selecting them using the mouse or via **Select All**.

## Moving KeyGroups

The order in which the individual keygroups appear in the list can be changed. To do this, left-click on the keyboard portion of a keygroup, drag it upward or downward and then release the mouse button. The keygroups in the list are renumbered automatically.

## Sorting KeyGroups

The **Sort by** option appears in the context menu of each keygroup. This option can be used to sort the keygroups. Sorting options include sort by **Low Key** or by **High Key** and sort **Ascending** or **Descending**.

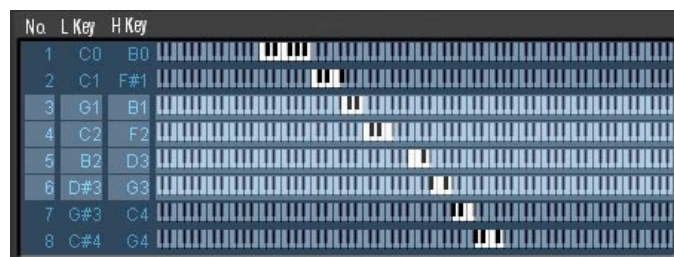
## Selecting KeyGroups

Parameters which are adjustable per keygroup (such as filter or envelope settings) can be adjusted simultaneously in multiple keygroups by first selecting all of the desired keygroups.

To select scattered keygroups, click on the desired keygroups one after another while continuously holding down the <Ctrl> key.



To select a contiguous range of keygroups quickly, left-click on the first keygroup in the range, then hold down the <Shift> key and click on the last keygroup in the range. All keygroups



which appear between these two in the list will also be selected.

The **Select All** option appears in the context menu of each keygroup. This option can be used to select all keygroups at one time.

If the KeyGroup list function **Edit All** is activated, keygroup edit functions will affect all keygroups and selection of specific keygroups is not effective. If you wish to select specific keygroups, first deactivate **Edit All**.

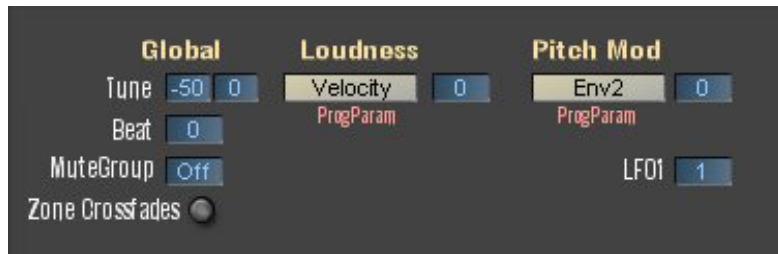
You can also select a keygroup by holding down the <Alt> key and playing a corresponding note on your keyboard. If the note you play is assigned to two or more keygroups, the one which appears first in the list will be selected.



## KeyGroupList Options

This section describes the various control elements in the **Options** drawer.

### The Global Page



**Tune:** Adjusts the tuning of the key group. The first text field sets the coarse tuning in semitones (+/- 50). The second field sets the fine tuning in cents (0..99).

**Beat:** This value sets a constant detuning factor. The acoustical 'beats' which result provide a sort of chorus effect - an added richness - to the voice.

**MuteGroup:** You can assign one of the 255 MuteGroups to each key group. This feature can be used effectively as in the following example: you have a key group with closed hi-hat samples, and another key group with open hi-hat samples. If you assign these to the same MuteGroup then only one can play at a time.

**Zone Crossfades:** Each of the four zones in a key group is active over a specific note velocity range that can be set freely and independently for each zone. If any of these zones overlap, activation of the **Zone Crossfades** function causes level crossfading between the two samples for note velocities within the overlap region. The result is a gradual transition from one sample to the other (instead of simple layering), similarly to keyboard crossfades. **Zone Crossfades** applies to all key groups in the program.

Bear in mind that enabling this option implies a reduction in voice polyphony, as two voices are required during the transition.

**Loudness:** The modulation source for volume applies to all key groups. You can adjust the degree of modulation (positive or negative) of the key group's samples in the text field to the right of the source field.

**Pitch Mod:** As above. The modulation source for pitch applies to all key groups. You can adjust the degree of modulation (positive or negative) of the key group's samples in the text field to the right of the source field.

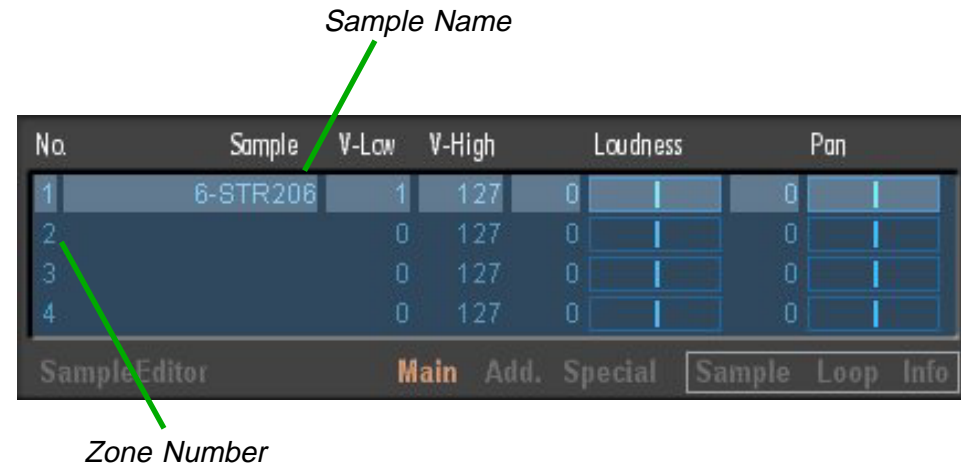
**LFO1:** This LFO is reserved specifically for pitch modulation. The intensity of the modulation is independently adjustable for each key group.

## The Zones Page

The four zones of the selected key group are represented on this page. Each zone is further subdivided into **Main**, **Add.**, **Sample** and **Loop** pages.

The parameters in the **Main** and **Add.** Pages are sample playback parameters which leave the sample unaltered and produce their effect only during playback. The parameters in the **Sample** and **Loop** pages alter the sample itself, however. Changes you make to parameters here are saved only when the sample is saved, so you must save the sample itself for these changes to be permanent. Since changing the sample affects all programs which use the sample, you may want to save the sample under a new name.

The **Zones** page is the starting point for recording new samples, and integrating existing samples.



No.	Sample	V-Low	V-High	Loudness	Pan
1	6-STR206	1	127	0	0
2		0	127	0	0
3		0	127	0	0
4		0	127	0	0

Sample Editor    **Main**   Add.   Special   Sample   Loop   Info

# Using Zones

## Loading Samples

To assign a sample to a zone, drag it from the File Browser to the *sample* field of the appropriate zone. The STS 5000 recognizes samples in the following file formats:

Akai S files

WAV files (8/16/24/32 Bit, Mono/Stereo)

AIF files (8/16/24/32 Bit, Mono/Stereo)

Since a zone can contain only monophonic samples it is necessary to load a stereo WAV sample twice, into two zones, so that the channel assignment for one can be set to *left*, and the other to *right*.

**If you drag a sample directly into the KeyGroup list, a keygroup is created automatically and the sample is assigned to the first zone.**

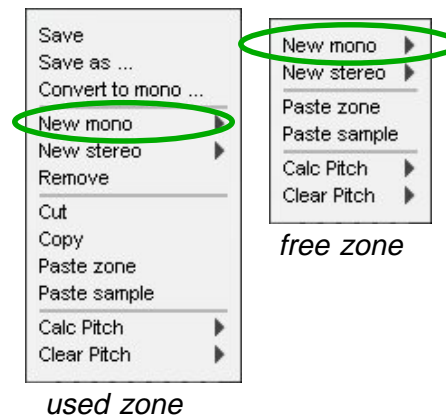
**If you drag a folder containing samples into the list, keygroups are created for all samples. The sample in each keygroup is assigned to the first zone, and the keygroups are distributed across the keyboard according to the root key values stored with each sample.**

## Recording New Samples

Right click ('Ctrl' + click in Mac version) on one of the zones of a new key group. From the context-sensitive menu select the sample type and format you want to create:

### New mono...

Provide the name and path for the new sample. Select the format (WAV, AIF) and confirm by hitting <Enter>. The sample is now ready to be recorded. In the Sample Editor you can select which input channel (right or left) to use for recording.

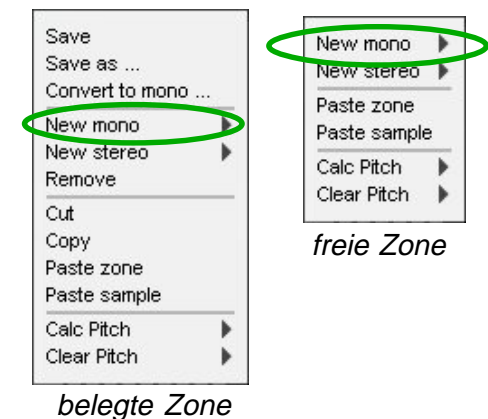


In the submenu, you can specify the bit depth at which recording is to be done (16/24/32 Bit).

### New Stereo...

Provide a name and path for the new sample. Choose format (WAV, AIF) and confirm with <Enter>. The selected zone is configured for left-channel playback, and the zone beneath for the right channel. The sample is now ready to be recorded. In the Sample Editor, both input channels will be used to record the sample.

Further details for recording new samples are found in the next chapter, **The Sample Editor**.



In the submenu, you can specify the bit depth at which recording is to be done (16/24/32 Bit).

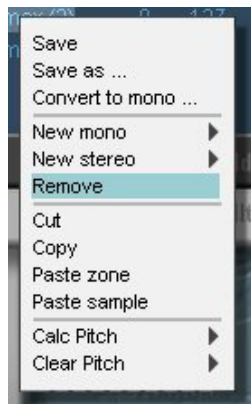


## Saving Samples

If you want to make any changes to the Sample or Loop parameters, and you want them to be permanent, you must save the sample. Click on the sample name with the right mouse button ('Ctrl'+click in the Mac version) and select **Save** from the context-sensitive menu. This option replaces the existing sample with the new sample definition. If you want to keep both versions, select **Save As...** and give the sample a new name. You can also select an alternate format for the sample at this time (WAV, AIF, or S).

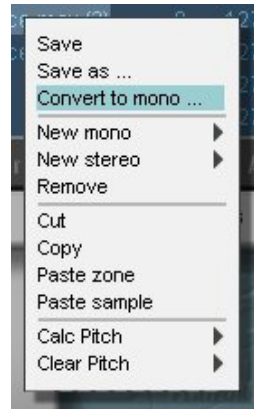
## Deleting Samples

Select the sample and strike the <Delete/NumLock> key to remove the sample from the zone.



You can also right click on the sample and use Remove from the context-sensitive menu to delete the sample from the zone.

## Converting Samples



It is possible to convert one channel of a stereo sample to a mono sample. Right click (Mac: 'Ctrl'+click) on the sample and select **Convert to mono** ... from the popup menu. In the dialog that appears provide a name, path and data format for the new sample.



You can also convert two mono sample files into a stereo sample.

Select the first sample and then, while holding the <Shift> key, select the second. Click with the right mouse button on one of the selected samples and choose **Convert to Stereo** from the popup menu. In the dialog, provide the name, path, and data format with which to save the new sample. The loop information used to create the stereo sample is taken from the settings in the first selected sample.

## Copying Zones

Select a zone and press <Ctrl+C>/<Apple+C> (or use **Copy** from the context-sensitive popup menu) to copy the zone to an internal buffer. Select the desired destination zone for the new copy, and press <Ctrl+V>/<Apple+V> (or use **Paste zone** from the popup menu to paste all zone parameters - **Paste Sample** copies the sample file reference only).



Pasting to an existing zone replaces the previous settings. You can also copy a zone to another key group or program.

## Moving Zones

Select a zone and press <Ctrl+X>/<Apple+X> (context-sensitive menu = **Cut**) to remove the zone settings to a copy buffer. Select the new destination zone and press <Ctrl+V>/<Apple+V>. You can move zones to other key groups or programs if desired.

## Main Page

**V-Low:** Sets the lower end of the velocity range in which the sample is to be played.

**V-High:** Sets the upper end of the velocity range in which the sample is to be played.

**Loudness:** Adjusts the relative volumes (higher or lower) of the samples (range = +/- 50).

**Pan:** Sets the fixed pan position of the sample (range = +/- 50).

For stereo sample playback, assign each of the two channels of a WAV file to its own zone and set Pan to -50 and +50 in zones 1 and 2 respectively.

No.	Sample	V-Low	V-High	Loudness	Pan
1	Speech	0	127	0	0
2	Speech	0	127	0	0
3		0	127	0	0
4		0	127	0	0

SampleEditor      Main   Add.   Special   Sample   Loop   Info

In general, with stereo WAV files, all sample parameters are adjusted for both channels simultaneously. (The only exceptions to this are the Pan and Individual Output assignment settings, for which this coupling of channels is usually unwanted.) However, if you wish to adjust the parameters of one stereo channel independently of the other channel, you can defeat the automatic channel coupling by holding down the <Alt> key while making the adjustment.

## Add. Page

**Tune:** Each sample can be independently tuned within a range of +/- 50 semitones (coarse) and +/- 100 cents (fine).

Edit the values as follows:

... Select the text field and enter the value directly. Note that you cannot enter a decimal point (.).

... Select the text field and, while holding the mouse button, move the mouse either vertically (coarse adjustment) or horizontally (fine adjustments).

**Filter:** Enter a value to offset the filter cutoff frequency (range = +/- 50).

**Out:** Determines whether a sample will be routed through an individual output. The actual destination output depends on this value, and the value set in the **IOut** parameter in the multi-program list. The **IOut** value is essentially an offset to which this **Out** value is added. Find additional information in the **IOut** parameter description.

No.	Sample	Tune	Filter	Out	Playback	VelStart
1	Speech	0.00		0		Off As sample 0
2	Speech	0.00		0		Off As sample 0
3		0.00		0		Off As sample 0
4		0.00		0		Off As sample 0

SampleEditor      Main    Add.    Special    Sample    Loop    Info

**Playback:** This parameter selects the playback mode for the sample as follows:

**As Sample:** The sample will play with its own, original settings.

**Loop Rel:** When the key is struck, the sample plays up to the loop, and the loop is repeated as long as the key is held down. When the key is released, the loop continues until the release phase.

**Loop>Rel:** When the key is struck, the sample plays up to the loop, and the loop is repeated as long as the key is held down. When the key is released, the loop is exited immediately, and playback continues beyond the loop end point.

**No Loops:** The sample plays through to the end while the key is pressed, but the loop is played through only once.

**To End:** The sample is played from beginning to end, regardless of the key state (in other words, the sample is triggered by the keyboard). Here, too, the loop is played only once.

**Vel Start:** Adjusts the start offset (positive or negative) of the sample depending on the velocity of the key played. The range is +/- 9999 sample words.

# Special Page

**Pitch Mode:** There are four basic ways to play back a sample: Resample, PitchShift, Formant and Robot.

To achieve optimal playback quality with PitchShift, Formant and Robot modes, the pitch progression of each sample must be analyzed (one time only per sample).

**Resample:** In this mode, the sample is played back at varying speeds – which may be higher or lower than the original speed – according to which key is played, in order to produce corresponding pitch variations. You’re no doubt already familiar with the same phenomenon as it occurs with turntables and analog tape machines.

No	Sample	Pitch Mode	Key Track	TimeStretch	Formant
1	voice max (2)	Resample	Track	0	0
2	voice max (2)	Resample	Track	0	0
3		Resample	Track	0	0
4		Resample	Track	0	0

SampleEditorMainAddSpecialSampleLoopInfo

**PitchShift:** In this mode, varying pitches are produced according to which key is played, without changing the playback speed of the sample. This means that, for example, the vibrato in a flute sample will have the same speed at every playback pitch (whereas in normal Resample mode, the vibrato, like the sample itself, would play back at a different speed at each pitch). In many cases, this mode can produce impressive results. However, the results are strongly dependent upon the nature of the sample, which in any case must first be analyzed using the *Calc Pitch* function. This function is found in the context menu of each sample (in the Zone page) and of each program (in the Program list). The analysis may take several seconds. The

results of the analysis are stored with the sample when it is saved – for this application, samples must be saved in WAV format.

This mode requires a comparatively high level of performance on the part of the CPU of your computer. The number of voices which can be played simultaneously using this mode is directly related to the CPU performance level and is typically lower than in Resample and PitchShift modes.

**Formant:** In this mode, as in PitchShift mode, playback speed is independent of note or pitch. Formant mode additionally compensates the shifting of formants which occurs as a normal result of pitch shifting, resulting in a substantially more natural sound, especially with singing or spoken-voice material. In Resample and PitchShift modes, pitch transposition alters not only the fundamental pitch of a sample, but all of its overtones as well, thereby altering the basic tonal characteristic (which, in the case of a human voice, is determined by the anatomy of the speaker and therefore independent of the sung or spoken pitch, thus enabling us to recognize the singer or speaker at all times). Formant mode preserves this tonal characteristic of the original sample at all playback pitches. This mode likewise requires an analysis via the **Calc Pitch** function.

This mode is the most compute-intensive mode and places a heavy burden upon the computer's CPU. The number of voices which can be played simultaneously using this mode is directly related to the CPU performance level and is typically lower than in the other modes.

In order to be able to successfully perform formant correction, the STS 5000 requires single-voice samples with a clearly defined pitch progression. Multi-voice samples or samples of an atonal or "noisy" character cannot be successfully analyzed by the STS 5000 in terms of their pitch progression and tend to produce unsatisfactory results with formant correction. This should be kept in mind while evaluating the sonic results.

**Robot:** In Robot mode, the sample is played back with a completely constant pitch. Any part of the sample whose pitch deviates from that of the played key is adjusted accordingly to neutralize the pitch variation. This results in a monotonal characteristic which, when applied to speech samples, makes them sound distinctly robotic, even Formant correction is performed in this mode.

**Pitch:** *Track* indicates that playback pitch will vary according to which note is played. With *Const*, the sample plays back at its original pitch on all keys.

**TimeStretch:** When a sample is played back in PitchShift or Formant modes, its playback duration can be modified via this parameter. For example, the tempo of a drum loop can be increased or decreased without changing its pitch. The TimeStretch setting can be viewed as an offset which applies to the sample independent of keyboard position.

Variation of the playback speed of a sample according to keyboard position can be realized by means of the keyboard modulation settings on the TimeStretch page.

**Formant:** When Formant mode is selected, formant ranges of the sample can be shifted by means of this offset. Formant compensation is thereby exaggerated in a positive or negative direction. This opens up the possibility of changing the tonal character of a sample (for example, changing a male-sounding voice into a female-sounding voice) without altering pitch or playback speed.

This mode supports sample transposition of up to 4 octaves upward or downward.

## The Analysis Procedure

Selecting the Calc Pitch entry in the context menu of a sample causes a submenu to open. In this submenu, you can select the type of analysis to be performed. Normally, you should simply select the suggested mode. However, if you are not satisfied with the results this produces, feel free to try any of the other available analysis methods.

**Speech:** This is the recommended method for analyzing spoken-word material.

You can also try this mode whenever the original sample has no large pitch variations, and when the fundamental pitch is at no point higher than 440 Hz.

This method is also especially suitable for use with single pitches, such as a single note played on a flute or violin.

**Instrument:** Use this method to analyze samples of a musical instrument or singing voice.

The highest fundamental pitch must be no higher than 1760 Hz.

This is often the best analysis method for samples of complex phrases.

**Bear in mind that the algorithms of the STS 5000 for correct playback of pitch- or formant-corrected samples require a single distinct pitch. Phrases containing chords or a substantial “chaotic” component typically produce unusable results.**

**Extra:** This mode accepts the widest range of pitches. Fundamental pitches can be as high as 1760 Hz. However, this mode should really be used only when the other two modes have failed to produce usable results. Normally, the constraints within which the other modes are designed to operate enable them to yield superior results with suitable material.



## Sample Page

The parameters on this page alter the actual sample material and changes must be saved with the sample if they are to be made permanent. Remember that saving a sample with these changes will affect all programs that use the sample.

**Start/End:** Displays and adjusts the sample's start and end insets.

**Key:** The pitch of the sample without any transposition, or, more accurately, the original pitch as sampled.

**Tune:** Each sample can be tuned within a range of +/- 50 semitones (coarse) and +/- 100 cents (fine). This parameter specifies the fundamental pitch of the sample itself.

No.	Sample	Start	End	Key	Tune	Channel
1	Speech	0	380863	C3	0.00	Left
2	Speech	0	380863	C3	0.00	Right
3		-1	-1	C-2	-0.00	
4		-1	-1	C-2	-0.00	

SampleEditorMainAdd. SpecialSampleLoopInfo

**Channel:** Permits selection of the left or right channel of a stereo (e.g., WAV format) sample for playback in the selected zone (stereo playback of stereo wave files requires the use of two zones, with each zone set to play one of the channels). For Akai format (.S) sample files, which are always mono, this parameter is set to Mono and is not editable.



## Loop-Page

The parameters on this page alter the actual sample material and changes must be saved with the sample if they are to be made permanent. Remember that saving a sample with these changes will affect all programs that use the sample.

**Start/End:** Identifies and adjusts the start and end insets of the sample's loop region.

**Fine:** A value in the subsample range used to make very fine adjustments to the loop end inset to achieve perfectly smooth loops.

**Playback:** Specifies the fundamental playback characteristic of the sample.

**Loop Rel:** When the key is struck, the sample plays up to the loop, and the loop is repeated as long as the key is held down. When the key is released, the loop continues until the release phase.

No.	Sample	Start	End	Fine	Playback	Toff
1	Speech	0	0	0	Loop Rel	0
2	Speech	0	0	0	Loop Rel	0
3		-1	-1	-1		-1
4		-1	-1	-1		-1

SampleEditorMainAdd. SpecialSampleLoopInfo

**Loop>Rel:** When the key is struck, the sample plays up to the loop, and the loop is repeated as long as the key is held down. When the key is released, the loop is exited immediately, and playback continues beyond the loop end point.

**No Loops:** The sample plays through to the end while the key is pressed, but the loop is played through only once.

**To End:** The sample is played from beginning to end, regardless of the key state (in other words, the sample is triggered by the keyboard). Here, too, the loop is played only once.

**TuneOffset (Loop):** Loops are not always perfectly in tune. Use this to adjust the tuning of the loop region (range = 0..127).

## Info Page

The **Info** page provides information regarding the source location and bit depth of a sample.

**SamplePath:** Indicates the path and filename of the referenced sample.

**PD:** This column indicates whether the sample has already been pitch-analyzed. If it hasn't, you can start an analysis of the sample by clicking on this icon.

**Bits:** Displays the sample's bit depth. Possible values include 16, 24 and 32 bits. You can manually alter this setting, thereby adjusting the sample's resolution setting. This change is then incorporated directly into the sample if the program is subsequently saved. This means that samples which were initially referenced at 24 bits can be converted to 16 bits and will be saved as such. On the other hand, 16-bit samples can also be converted to 24-bit or 32-bit format – which, however, produces no increase in sound quality.

No.	Sample	SamplePath	PD	Bits
1	voice attack	E:/Samples for STS5000/voice attack.wav	•	16
2	voice attack	E:/Samples for STS5000/voice attack.wav	•	16
3			•	
4			•	

SampleEditor    Main   Add.   Special   **Sample**   Loop   **Info**

The use of 24-bit and 32-bit samples imposes a somewhat higher overhead as compared to that of 16-bit samples and reduces the available voice count by one-half. Therefore, it is strongly recommended that you consider the use of such samples carefully and use your own ears to critically evaluate whether it is worthwhile to use the higher bit depth.

## Filter Page

The STS 5000 features an extremely high-performance and above all flexible filter section. With 25 different filter types, it not only successfully handles standard situations, but also opens the door to a great deal of creative experimentation. A description of the fundamental parameters is provided here. The various filter types are discussed individually in the following pages.

**Type:** Here, select the desired filter type. The capabilities of the filter, and therefore the available parameters, depend upon this selection. Some filters do not offer resonance, but in its place offer a gain control.



**Frequency:** Set the filter cutoff frequency here. The cutoff frequency represents the boundary between the frequency range which is processed by the filter and the range which is unaffected by it. In other words, the cutoff frequency is the point at which the filter begins to have an effect. Depending upon the filter type, the unaffected frequency range may be below, above or on both sides of the cutoff frequency. Filters are named according to the unaffected frequency range (highpass, lowpass or bandpass). Varying the cutoff frequency over time – for example, by means of an envelope or LFO – results in the creation of variations in tone color. The basic cutoff frequency can be adjusted from 0 through 99 in one hundred steps.

Filters are generally also characterized by their cutoff slope, which is specified in dB per octave and indicates how strongly a filter works. A filter with a cutoff slope of 12 dB per octave attenuates (decreases the level of) signals passing through it according to frequency, such that a frequency shift of one additional octave away from the cutoff frequency results in an additional level decrease of 12 dB. The higher the number of decibels, the steeper is the filter cutoff and the frequency-related signal attenuation.

**Resonance:** Resonance is the second important parameter. Most filter types have this parameter. A resonant filter boosts frequencies in the vicinity of the cutoff frequency by means of feedback of the filtered signal. At high resonance settings, this effect can become so strong that the filter begins to oscillate precisely at the cutoff frequency, which is the most strongly boosted frequency. This behavior is referred to as “self-resonance”. The sonic effect of resonance is often described as “chirping”, that of strong resonance even as “screeching”. The various filter types in the STS 5000 exhibit differing behavior with respect to self-resonance. Some of them attenuate the original signal when they begin to resonate and do not offer a full-fledged self-resonant mode (“original signal” refers here to the portion of the input signal which lies in the unaffected frequency range). Those filters with an “R” at the end of their name attenuate the input signal only slightly or not at all and therefore offer full self-resonance. Resonance can be adjusted from 0 through 999 in one thousand steps.

**Res Mod:** Filter resonance can be modulated by a freely-selectable modulation source. Here, select the source, amount and direction of the modulation.

**Key Follow:** This parameter can be used to cause filter cutoff frequency to vary in relationship to keyboard position. The adjustment range is -50 through +50. A setting of +12 is “standard” and produces “neutral” cutoff tracking of one octave per keyboard octave.

**Freq Mod:** Filter cutoff frequency can be modulated by up to three modulation sources. The sources are specified as program parameters which apply over all keygroups. The amount and direction of cutoff frequency modulation can be specified here independently for each keygroup.

## Filter Types

**1.) 2-Pole Lowpass:** This filter attenuates frequencies above the cutoff frequency at the rate of 12 dB per octave. The filter cannot be adjusted into full resonance – the original signal is somewhat attenuated, so that the range near resonance is especially nicely emphasized.

**2.) 2-Pole Lowpass R:** This filter attenuates frequencies above the cutoff frequency at the rate of 12 dB per octave. The original signal is attenuated only slightly, so that the range near resonance is somewhat less strongly emphasized, and the filter offers full self-resonance.

**3.) 4 Pole Lowpass:** This filter attenuates frequencies above the cutoff frequency at the rate of 24 dB per octave. It is otherwise similar to the 2-Pole Low Pass.

**4.) 4-Pole Lowpass R:** This filter attenuates frequencies above the cutoff frequency at the rate of 24 dB per octave. It is otherwise similar to the 2-Pole Low Pass R.

**5.) 6 Pole Lowpass:** This filter attenuates frequencies above the cutoff frequency at the rate of 36 dB per octave. It is otherwise similar to the 2-Pole Low Pass.

**6.) 6-Pole Lowpass R:** This filter attenuates frequencies above the cutoff frequency at the rate of 36 dB per octave. It is otherwise similar to the 2-Pole Low Pass R.

**7.) 2-Pole Highpass:** This filter attenuates frequencies below the cutoff frequency at the rate of 12 dB per octave. The filter cannot be adjusted into full resonance – the original signal is somewhat attenuated, so that the range near resonance is especially nicely emphasized.

**8.) 2-Pole Highpass R:** This filter attenuates frequencies below the cut-off frequency at the rate of 12 dB per octave. The original signal is attenuated only slightly, so that the range near resonance is somewhat less strongly emphasized, and the filter offers full self-resonance.

**9.) 4-Pole Highpass:** This filter attenuates frequencies below the cut-off frequency at the rate of 24 dB per octave. It is otherwise similar to the 2-Pole High Pass.

**10.) 4-Pole Highpass R:** This filter attenuates frequencies below the cut-off frequency at the rate of 24 dB per octave. It is otherwise similar to the 2-Pole High Pass R.

**11.) 2-Pole Bandpass:** This filter attenuates frequencies above and below the cutoff frequency at the rate of 6 dB per octave. The filter cannot be adjusted into full resonance – the original signal is somewhat attenuated, so that the range near resonance is especially nicely emphasized.

**12.) 2-Pole Bandpass R:** This filter attenuates frequencies above and below the cutoff frequency at the rate of 6 dB per octave. The original signal is attenuated only slightly, so that the range near resonance is somewhat less strongly emphasized, and the filter offers full self-resonance.

**13.) 4-Pole Bandpass:** This filter attenuates frequencies above and below the cutoff frequency at the rate of 12 dB per octave. It is otherwise similar to the 2-Pole Band Pass.

**14.) 4-Pole Bandpass R:** This filter attenuates frequencies above and below the cutoff frequency at the rate of 12 dB per octave. It is otherwise similar to the 2-Pole Band Pass R.

**15.) Contrary Bandpass:** This bandpass filter is similar to the 2-Pole Bandpass, but attenuates the frequency range below the filter center frequency less than the range above. This gives the Contrary Bandpass filter a light lowpass character.

**16.) Swept EQ 1 octave:** This filter is essentially similar to an equalizer bell filter. It has a constant-width pass/stop band of one octave over its entire frequency range. It can boost or cut signal level by up to 24 dB within the pass/stop band.

**17.) Swept EQ 2 -> 1 octave:** This filter is essentially similar to an equalizer bell filter, but has a varying-width pass/stop band of two octaves at the lower end of its frequency range and one octave at the upper end. Changing the filter frequency thus also dynamically changes the width of the pass/stop band. The filter can boost or cut signal level by up to 24 dB within the pass/stop band.

**18.) Swept EQ 3 -> 1 octave:** This filter is essentially similar to an equalizer bell filter, but has a varying-width pass/stop band of three octaves at the lower end of its frequency range and one octave at the upper end. Changing the filter frequency thus also dynamically changes the width of the pass/stop band. The filter can boost or cut signal level by up to 24 dB within the pass/stop band.

**19.) Swept Low Shelving EQ:** This filter is essentially similar to an equalizer lowpass filter and can produce a boost of up to 24 dB. To obtain a low cut shelving characteristic, use a Shelving High Filter to boost the high frequencies, which produces results equivalent to those of a low cut shelving filter.

**20.) Swept High Shelving EQ:** This filter is essentially similar to an equalizer highpass filter and can produce a boost of up to 24 dB. To obtain a high cut shelving characteristic, use a Shelving Low Filter to boost the low frequencies, which produces results equivalent to those of a high cut shelving filter.

**21.) 2-Pole Notch Filter:** This filter permits the complete suppression of specific frequencies without affecting nearby frequency ranges. Only frequencies directly around the cutoff frequency are removed. The frequency response curve exhibits a deep notch at this frequency. With this filter, the resonance parameter adjusts the notch width. In addition, at full resonance, the response curve exhibits a small resonant hump above the notch frequency.

**22.) Phaser1:** This filter produces a phasing effect. Structurally, it resembles a combination between notch filter and peak filter. With this filter, the resonance parameter adjusts the peak boost or the notch width, thereby intensifying the phasing effect.

**23.) Phaser2:** This is a classic phaser effect which is generated via a combination of three notch filters and three peak filters. With this filter, the resonance parameter adjusts the peak boost or the notch width, thereby intensifying the phasing effect.

**24.) Contrary Phaser:** This is a new type of comb filter which combines two notch filters with a bandpass filter. The frequency response curve is essentially similar to that of a bandpass filter exhibiting a notch on both sides of the filter center frequency. The resonance control adjusts the widths of the notches and that of the pass band. At full resonance, the notches develop small resonant humps, thereby intensifying the phasing effect.

**25.) Flanger Lite:** This filter produces a light flanger effect which is generated by means of three notches similar to those of comb filters. The resonance control here serves to intensify the flanging TimeStretch Page



## TimeStretch Page

This page permits modulation of the formant content or the playback duration of a sample. All of the usual modulation sources are available here. For example, you can use an envelope generator to speed up and slow down a drum loop, or use an LFO to periodically fade a voice sample from male-sounding to female-sounding and back – the possibilities are enormous.

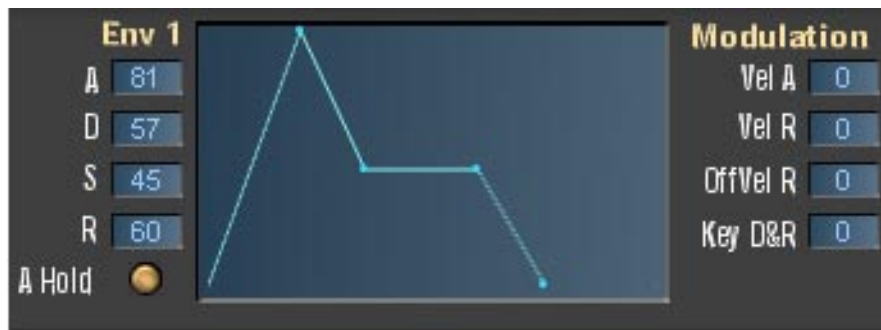
**Formant Modulation:** Select up to three sources and then, for each source, adjust the modulation intensity via the neighboring field. The adjustment range is -50 through +50 – the sign indicates the direction of the modulation.



**Time Stretching Modulation:** Select up to three sources and then, for each source, adjust the modulation intensity via the neighboring field. The adjustment range is -50 through +50 – the sign indicates the direction of the modulation.

## Env1 Page

Click on **Env1** at the bottom of the KeyGroupList panel's **Options** drawer to display the Env1 Page, which provides access to the volume envelope settings for the selected key group.



**Env1** is an example of the classic ADSR envelope. When a key is struck the Attack phase begins and continues until maximum volume is reached. Then the Decay phase begins, which determines the amount of time taken for the signal to reach its sustain level. The Sustain level is the level which is maintained while the key is pressed. The Release phase begins when the key is released. The Release value determines the time it takes for the signal to fade to 0. If the key is released before the Attack or Decay phases have completed, the envelope skips to the Release phase.

**A (Attack):** Sets the envelope's attack time (0..99).

**D (Decay):** Sets the time it takes to fade to the sustain level after the maximum level has been reached.

You can use mouse to drag the 'nodes' in the graphic display to adjust the envelope parameters.

**S (Sustain):** The volume level to hold (while the key is held) after the attack and decay phases.

**R (Release):** The time it takes for the note to fade out after the key has been released.

**A Hold:** Enable **Attack Hold** to hold the maximum level at least until the loop start is reached (if there is a loop, and the key is held). Only then will the Decay phase begin. This is useful, for example, with percussion samples without loops, which have their own, intrinsic, decay characteristics, and do not need an artificial decay.

**Vel A:** This value determines how much influence the Note-on velocity has over the attack time (range = +/- 50).

**Vel R:** This value determines how much influence the Note-on velocity has over the release time (range = +/- 50).

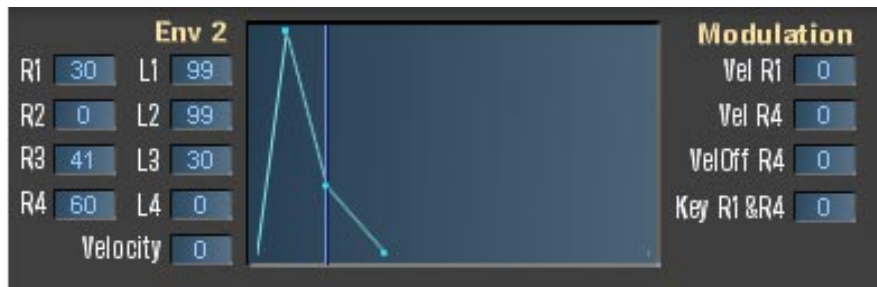
For **Vel A** and **Vel R**, positive values shorten the times, and negative values lengthen them.

**OffVel R:** This value determines how much influence the Note-off velocity has over the release time (range = +/- 50). In this case, a positive value lengthens the release time, and a negative value shortens it.

**Key D&R:** Determines how much influence keyboard position (note number) has over the decay and release times. A positive value will lengthen the both envelope times as the pitch rises. Negative values, however, correspond to the way instruments behave in real-life.

## Env2 Page

Click on **Env2** in the Options drawer to bring up this page. This envelope is used most often to control the filter. It is similar to Env1, but it has an extra node (R2/L2) before the Sustain point (R3/L3), and the settings (especially attack and initial decay) are more flexible. The settings, including the release point, are independent of Env1.



**R1..R4:** These are **Rate** settings which control the time it takes to proceed from one stage of the envelope to the next. Or, put another way, the amount of time (Rx) it takes to reach the next volume level (Lx).

**L1..L4:** These values represent the target levels for each envelope stage.

**Velocity:** Adjusts the degree to which the Note-on Velocity modulates the overall envelope level (range = +/- 50).

**Vel R1:** Sets the amount of effect which note-on velocity has upon the R1 time setting (range: -50 .. +50). Corresponds roughly to attack time modulation. At positive settings, higher velocities increase this time, while at negative settings, higher velocities decrease it.

**Vel R4:** Sets the amount of effect which note-on velocity has upon the R4 time setting (range: -50 .. +50). Corresponds to release time modulation. At positive settings, higher velocities increase this time, while at negative settings, higher velocities decrease it.

**VelOff R4:** Sets the amount of effect which note-off velocity has upon the R4 time setting (range: -50 .. +50). Corresponds to release time modulation. At positive settings, higher velocities increase this time, while at negative settings, higher velocities decrease it. Note that not every MIDI keyboard is capable responding to key-release dynamics and sending variable note-off velocity values.

**Key R1&R4:** Sets the amount of effect which keyboard position has upon both the R1 and R4 time settings (range: -50 .. +50). At positive settings, keys higher up the keyboard increase these times, while at negative settings, keys higher up the keyboard decrease them (negative settings thus correspond to the behavior of 'natural' instruments).

## Env 3 Page

Click on the **ENV 3** entry of the Options drawer to bring this page up. This envelope is identical to Env2.

**R1..R4:** These are **Rate** settings which control the time it takes to proceed from one stage of the envelope to the next.

**L1..L4:** These values represent the target levels for each envelope stage.

**Velocity:** Adjusts the degree to which the Note-on Velocity modulates the overall envelope level (range = +/- 50).

**Vel R1:** Sets the amount of effect which note-on velocity has upon the R1 time setting (range: -50 .. +50).

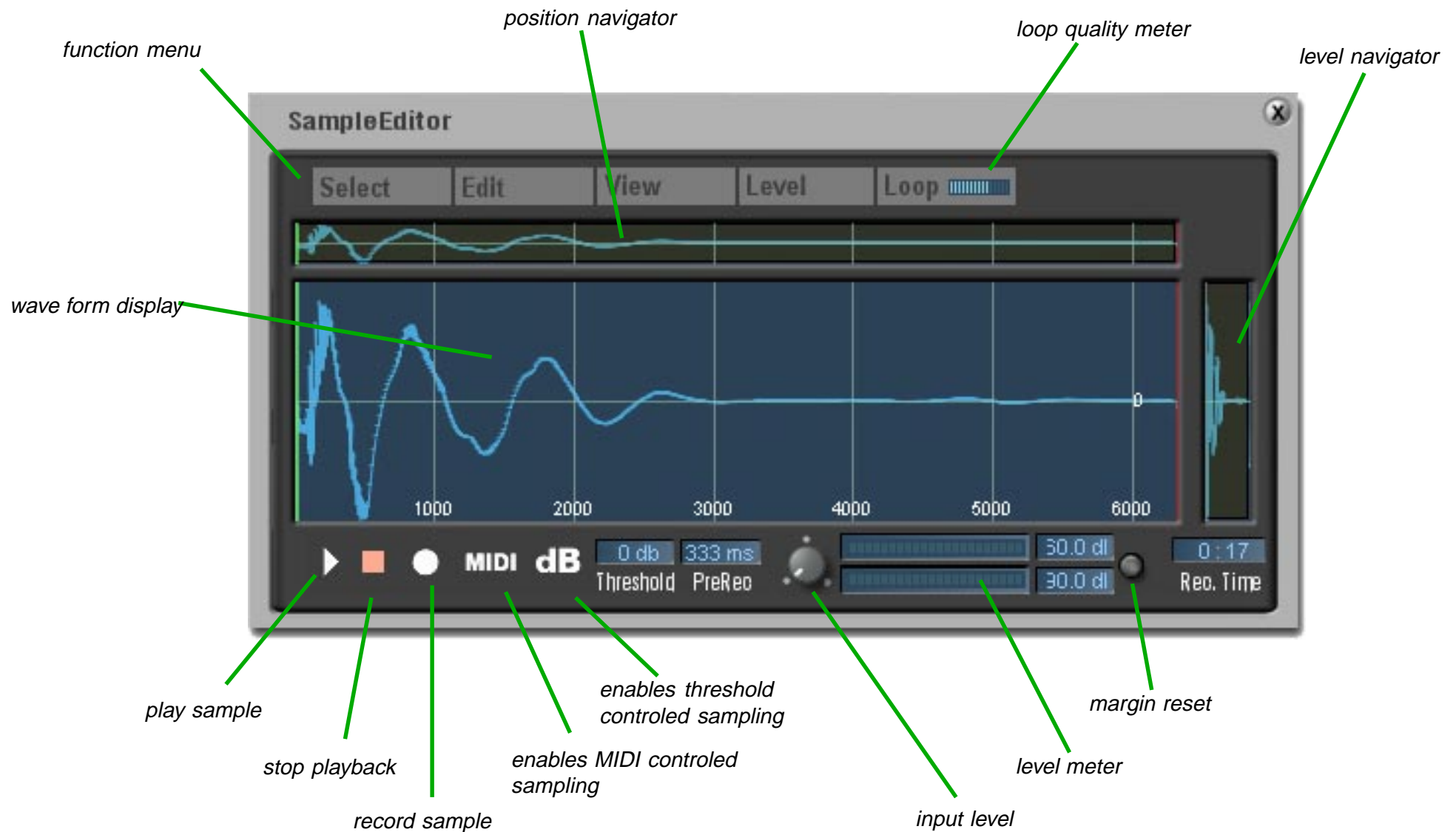
**Vel R4:** Sets the amount of effect which note-on velocity has upon the R4 time setting (range: -50 .. +50).



**VelOff R4:** Sets the amount of effect which note-off velocity has upon the R4 time setting (range: -50 .. +50). Corresponds to release time modulation. At positive settings, higher velocities increase this time, while at negative settings, higher velocities decrease it. Note that not every MIDI keyboard is capable responding to key-release dynamics and sending variable note-off velocity values.

**Key R1&R4:** Sets the amount of effect which keyboard position has upon both the R1 and R4 time settings (range: -50 .. +50). At positive settings, keys higher up the keyboard increase these times, while at negative settings, keys higher up the keyboard decrease them (negative settings thus correspond to the behavior of 'natural' instruments).

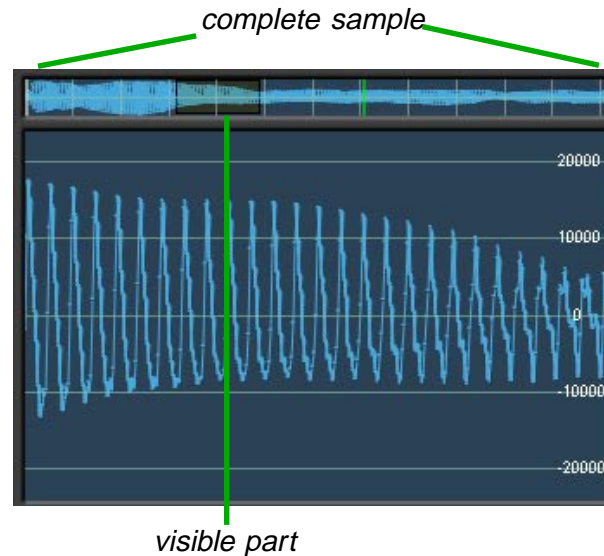
# The Sample Editor



This chapter describes the operation and functionality of the Sample Editor. To open the Sample Editor, first open the **Zones** page from the **Options** drawer of the KeyGroupList panel. Next, click on **SampleEditor** in the lower left corner of the Zones page. The Sample Editor serves not only to define and edit samples, it is also where new samples are recorded.

## The Waveform Window

The nature of the waveform display in the window depends on whether the sample is mono or stereo. With stereo samples, the display is subdivided into an upper and lower area. It can also be again subdivided into right and left sections to aid in loop editing. In this case, the left area displays the sample up to the loop end inset, and the right part displays the portion of the sample after the loop start inset. If the sample is in stereo, the window can be divided into quarters. In all sections of the window, the techniques for moving, zooming and selecting are identical.

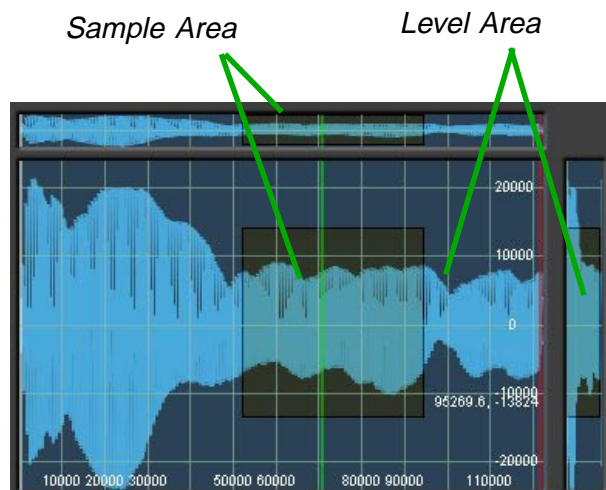




## Zooming in the Waveform Window

### Zooming (Time Scale)

Press and hold the right mouse button ('Ctrl'+mouse button in Mac OS) while dragging the mouse cursor over the time range you want to zoom in on. As you drag the mouse, the range will be identified as a darkly colored area within a rectangular frame. When you release the mouse button, the wave shape will be redrawn at the new zoom level. You can also identify the zoom range in the narrow position navigator above the work area.



*before releasing the mouse button*

Return to the full view by doubleclicking (with the (left in PC version) mouse button) in either the main window or the position navigator.

### Zooming (Time and Level)

To select both time and amplitude ranges to zoom in on, select a rectangular area with the right mouse button ('Ctrl'+mouse button in Mac OS) while holding down the <Shift> key. When you release the button, the waveform will be redrawn at the new zoom range with respect to both time and amplitude.

You can also zoom with regard to level directly in the Level Navigator.

To return to the full overview, doubleclick in the main waveform window.

### Stepwise Zooming

Use the <+> and <-> keys on the computer keyboard to zoom in or out respectively (through fixed zoom levels).

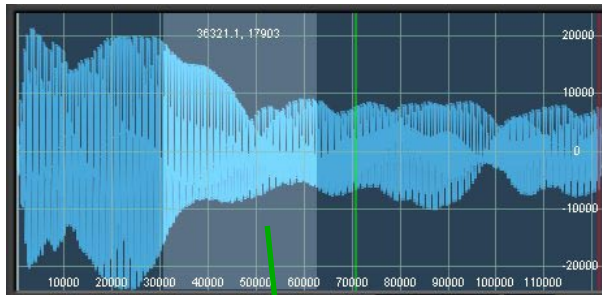
### Scrolling through the Sample

If you are zoomed in on a sample you can move (scroll) through the sample by pressing the <Space> bar and shifting the view with the left mouse button. Release the <Space> bar as soon as it begins to scroll to increase responsiveness.

You can also use the Navigators to scroll through zoomed sample. See the section **The Navigators**.

## Selection

To operate on a specific portion of a sample it is necessary to first select it. To do this, use the mouse with the (PC: left) button pressed to delineate a selection area. The area will be highlighted when selected.



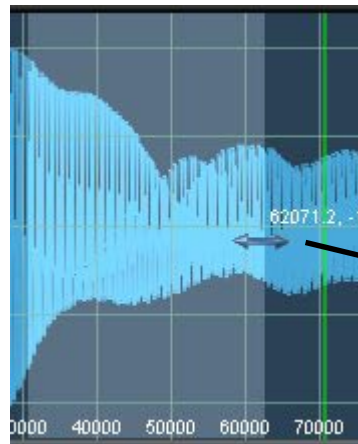
*Selected Area*

Doubleclicking on a selected area will zoom in on it to fit the window.

You can also use the **Select** menu to automatically select the entire sample, **Select All**, or to select the loop range, **Select Loop**. The **Select All** entry has a keyboard equivalent, `<Ctrl+A>/<Apple+A>`.

## Adjusting the Selection

Once the selection is made, you can still adjust it. As you move the mouse cursor towards a selection boundary, the shape will change to a double-arrow indicating that you can now drag the boundary with the mouse button.



*selection can be modified*

## Canceling the Selection

At any time you can cancel the current selection by striking the `<Esc>` key. The previous selection is also canceled when you set a new range.

## Copy/Move Selection Contents

The contents of the selected range can be copied or moved to another location in the sample, or into a sample in another key group zone using the **Edit** menu **Cut**, **Copy**, **Paste** entries.

You can also use the following keyboard equivalents:

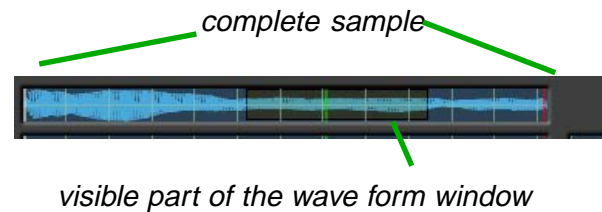
`<Ctrl+X>/<Apple+X>` **Cut**

`<Ctrl+C>/<Apple+C>` **Copy**

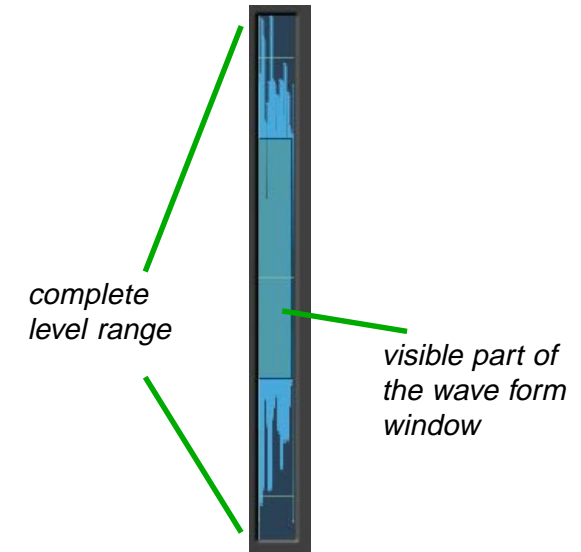
`<Ctrl+V>/<Apple+V>` **Paste**

## The Navigators

Two 'Navigators' help make it easy to move throughout a sample when a selection area occupies the entire display window (i.e. when you are zoomed in). There is one Navigator above the main display area (time navigation), and another to the right (level navigation). Both Navigators maintain a view of the entire sample at all times. The area that appears in the main display is identified in the Navigators as a marked block. Use the mouse to shift the marked block to different portions of the sample.



The Navigators can also be used to control the zoom levels. Adjust the right or left boundaries (or the upper and lower edges in the Level Navigator) of the marked block to register the new block in the main waveform display.



The Level Navigator behaves similarly to the Time Navigator, but the time scale is highly compressed. Use this to control the amplitude zoom level, and to register a vertical portion of the waveform for display in the main window. Adjust the marked block to specify the view range.

## The Editor Menus

The Editor's menu system is enabled when you click on one of the menu headings. When enabled, you can move through the various menus without again clicking the mouse. The currently selected entry is shown in blue. When you click on the desired entry, the menu closes.

'Option' entries that do not link to an action are toggled on and off with repeated mouse clicks.

If an action or option is not available it is 'grayed-out'. For example, the menu entries **Edit** and **Level** will not be available unless a range is selected within the sample (or the whole sample is selected).

### Menu: Select

**All:** Click on **All** to select the entire sample. For example, you would most likely use this when normalizing.

You can also use the <Ctrl+A>/<Apple+A> key combination to select the entire sample.

**Loop:** Click on the **Loop** entry to mark the sample's Loop range as selected. This option could be used, for example, to produce a sample that contains only the loop range.

The Loop range can also be selected by using the keyboard equivalent <Ctrl+L>/<Apple+L>.



### Menu: Edit

**Cut:** Use **Cut** to remove the selected range and place it in a copy buffer. You can use **Paste** to insert the cut range into another location.

**Copy:** **Copy** places the selected range in a temporary buffer so you can later **Paste** it in another location. It does not remove the range from the sample.

**Paste:** Inserts the contents placed in the copy buffer by the last **Cut** or **Copy** operation. The contents will be inserted at the right edge of the current selection area.

A copied sample range can be pasted into another sample in another zone. It can also be pasted into another program.



**Delete:** Removes the selection range from the sample. The portion of the sample preceding the range is shifted forward.

**Extract:** Isolates the selected range by removing everything that precedes and follows it. This is similar to a graphic 'crop' function. Use this to extract, for example, a single instrument from a drum loop sample.

**Reverse:** Reverses the play direction of the selected range.

Remember that any moving, copying, deleting etc. that you do to a sample must be saved with the sample to become permanent. To save a sample, right click on its name in the zone and select **Save** from the context-sensitive menu. If you do not want to replace the original sample (and you may not!) use **Save as...** instead. This allows you to save the sample under a different name. This is important if other programs use the sample as well, as they too will be affected if the sample is changed.

## Menu: View

**Splitter:** The **Splitter** lets you view two different portions of the sample with independent control over each view.

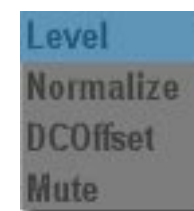


**Link Range:** When **LinkRange** is enabled, the zoom factors in the two splitter views will be linked, guaranteeing that they are the same in each one. This is useful when tailoring perfect loops.

**Coordinate:** Switches the display of the editor coordinates on or off. When the option is enabled, two coordinates are actively displayed as the mouse moves. The first corresponds to the position in the sample, and the second to the value of the sample word at that position.

## Menu: Level

**Normalize:** Use **Normalize** to raise the sample (or a sample range) to its maximum possible level. It works by looking for the highest amplitude and determining the difference between it and maximum amplitude (0db). Then the entire sample (or range) is scaled to fit.



**DCOffset:** Offsets the sample data within the selected region as required to eliminate any 'net' DC level from the sample (most often resulting from faulty sampling electronics). Typically applied to an entire sample. DC offsets in samples can produce a number of undesirable effects, including reduced dynamic range, difficulty in looping, popping sounds and, in extreme cases, amplifier stress and speaker damage. Such offsets cannot be reliably detected via visual inspection of a sample in the editor.

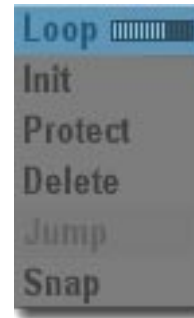
The only DC components which you can see are the 'dangerous' ones. When a serious DC component is present, the sample will appear to be displaced vertically above or below the zero (middle) line.

Select the entire sample and choose **DCOffset** to remove the DC component from the sample.

**Mute:** Use the mute function when you want to silence a selected region.

## Menu: Loop

**Init:** Creates a loop that initially includes the entire sample. The left boundary (loop begin) is indicated by a green vertical line, and the right (loop end) with a red one.



**Protect:** Enable **Protect** to ensure that the loop points won't accidentally be shifted.

**Delete:** Removes the loop points.

**Jump:** When the split display is in use, this function updates the display in both edit windows to clearly show the transition from loop end to loop start: the loop end is displayed at far right in the left window, with the loop start shown directly 'after' it at far left in the right window. This function is typically used after zooming in on one loop point, to quickly bring the other loop point into view in the other edit window.

**Snap:** When this option is activated, edits to the loop end point cause it to jump directly to points which are good matches for the currently selected loop start point – i.e., points which match both the level and the slope of the loop start point. This prevents snapping or pops at the loop boundary.

This function is intended to be an aid. Don't rely on it to find the perfect loop for you automatically.



# Sampling

Sampling controls, including controls for monitoring of signal sources and recorded samples, are located at the bottom of the Sample Editor window.



**Play:** Plays the currently loaded sample. The sample will play in its 'raw' form (without sonic treatment from filters etc.) through the STS 5000's **Smpl** output. The level meters indicate the play level.

If you enable the loop function and play the sample, the loop portion will be continuously repeated. Use this to make adjustments to the loop in real time. While the sample is playing in the editor, no other samples or key groups can be played.

**Stop:** Click on this icon to stop sample playback or recording.

ton to begin recording a sample. After you have recorded a sample you will be given the option of overwriting the previous sample or not. Sample recording can be triggered two ways - by MIDI Note-on, or by threshold triggering.

**MIDI:** Click on the MIDI button to initiate recording when the next MIDI Note-on event is received. An appropriate MIDI source must be connected to the STS 5000.

**dB:** Click on the dB button for recording to start as soon as the input level exceeds a specified threshold value.

**Record:** Click on this but-

**Threshold:** The value in this text field, expressed in dB, is the value which the input signal must exceed in order for dB recording to start (above).

**PreRec:** Some signals, such as a snare drum, begin with a sudden impulse and it can be difficult to capture them completely during threshold recording. Often a portion of their attack phase is lost. To solve this problem you can use the **Pre Record** feature to add some extra time in front of the specified record start. This pre-record buffer can be adjusted to up to 333 ms. The recording into the buffer and the sample itself are engineered in such a way that, in effect, recording started slightly earlier than specified by the various parameters.

**Input Gain Control:** You can adjust the input level to a value sufficiently high to record with the best possible quality. At the furthest left, the potentiometer produces no amplification of the input signal. In the middle position, the level is increased by about 8dB. The maximum gain (full right) is 12 dB.

**Level Meters:** The level meters display the input or output levels depending on whether you are in record or play. The upper LED chain indicates left channel signal levels, and the lower one displays the right channel.

**Channel Selection:** When recording a mono sample you must decide which channel to use for recording. Click on the upper selector to use the left channel, or the lower one to use the right.

**Margin Display/Reset Button:** The margin readout displays the highest level reached thus far. The value changes only when a higher level is detected, or when you operate the reset switch. The margin display helps you quickly determine how much headroom you have available so you can set an appropriate input gain level.

**Rec Time:** The current time of the recording in progress, or the total length of the sample (minutes:seconds).

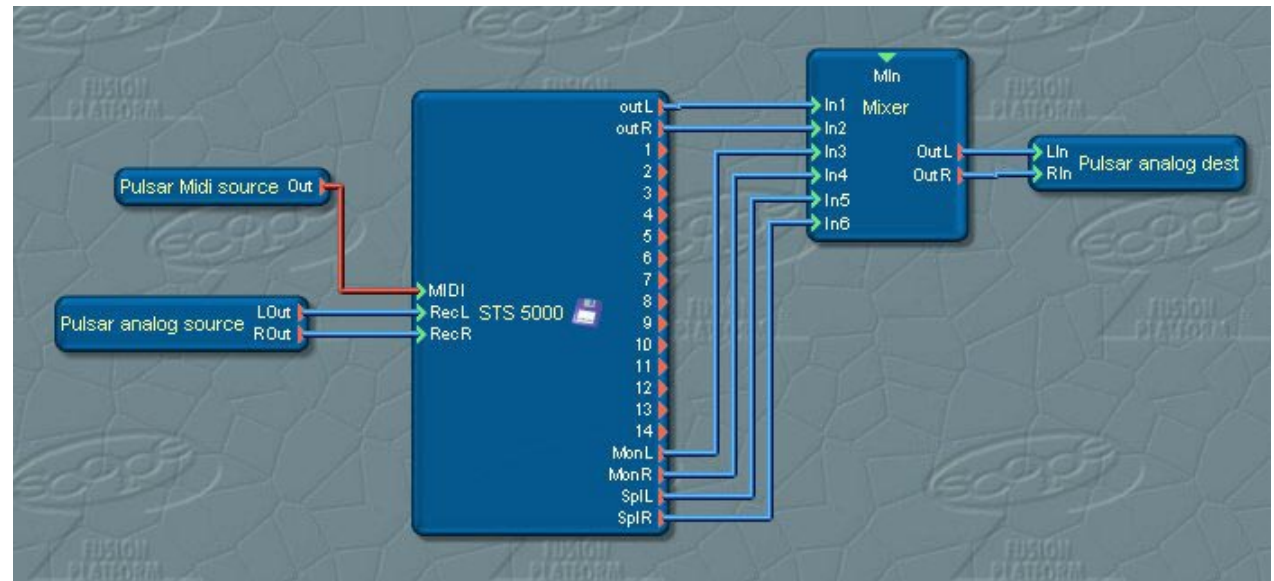
# Sampling Tutorial

The sampling capabilities of the STS 5000 provide you with all the tools necessary to capture sounds and organize them into effective keyboard programs such as you find in commercial packages. This chapter leads you step-by-step through the process of acquiring and preparing sounds, and engineering them into useful, playable, keyboard programs.

## Preparations

The first step in recording is to connect and configure the cables and logical connections for sample recording. The illustration shows a typical setup in which the analog inputs are used for the input signal.

The mixer combines the monitor and editor outputs to provide a composite signal which is routed to the analog outputs.



*typical setup, e.g. to sample a guitar over the analog inputs*

The monitor outputs, **MonL** and **MonR**, provide the record signal after the STS 5000's input gain stage, so you hear exactly what you record.

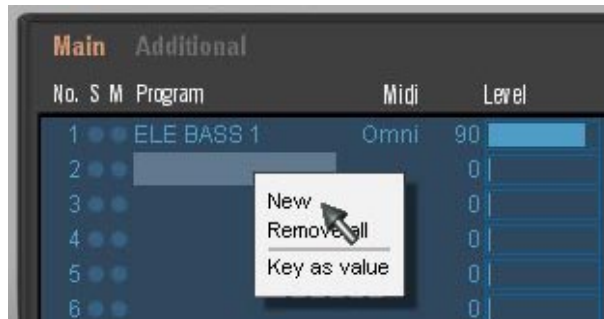
The **SpL** and **SpR** outputs provide a 'pure' sample playback signal, unprocessed by any of the STS 5000's signal processing stages.

After configuring the cables and connections a few steps remain before beginning to record.

A sample requires a zone, which requires a key group, which, in turn, requires a program. Therefore we begin by creating a new program.

## Creating a Program

In the main panel, right click (Mac: 'Ctrl'+click) on an available slot in the multi-program list and select **New** from the context-sensitive menu.



A new program is loaded and the various parameters are initialized to meaningful default settings.

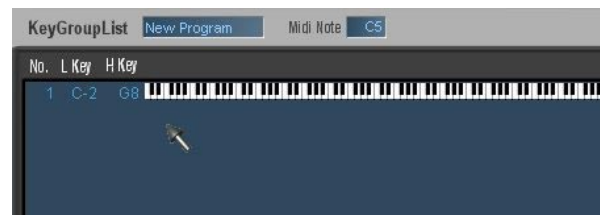


## Creating a Key Group

Select the new program, if it is not selected already, and open the **KeyGroup panel**. Right click (Mac: 'Ctrl'+click) in the KeyGroupList window and select **New** from the popup menu.



A new key group is added and the entire keyboard range is assigned to it.



You can, if you want, assign a new range within which the new sample will play back.

## Specifying the Key Group's Keyboard Range

To establish the key group's play range adjust the **L Key** (lowest playable note) and **H Key** (highest playable note) values. To do this, click on the field, and while holding it down, move the mouse vertically (coarse adjustment) or horizontally (fine adjustment) until the desired value is displayed. Then release the mouse button.

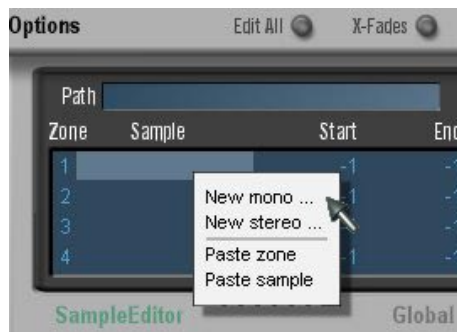


You can also enter note values into these fields from an attached MIDI keyboard. Enable the **MIDI to Span** option on the main panel to use this feature.

Select the **L Key** field with the mouse and play the note on the MIDI keyboard corresponding to the lowest note in the range. The note will be registered in the field. Now select the **H Key** field and play the highest note. The playable range is now defined.

## Creating a Zone

The next step is to initialize a zone to receive the newly recorded sample. Open the KeyGroup panel's **Option** drawer and select the Zones page. If no zones appear in the zone list, select the new key group (created above) with the mouse. The four zones for this key group are now listed.



Right click (Mac: 'Ctrl'+ click) on Zone 1 and select either **New Mono** or **New Stereo** depending on which type of sample you want to record. For this example, select New Mono.

In the file selector dialog that appears choose the directory in which to store the sample, and give the sample a file name.

**Note for Mac users:** In the Mac version you must absolutely include the file extension (\*.wav, \*.aif) in the filename.

Now you're ready to record the sample. Open the **SampleEditor** (click on 'SampleEditor' in the lower left corner of the Options drawer).

## Recording

Recording can be initiated several ways.

### Manual Recording



Click on the **Record** button to start recording.

### MIDI Controlled Recording



Click on the **MIDI** button. Recording will begin when the next MIDI Note-on event is received (i.e. a key is pressed on the attached MIDI keyboard). This method can be particularly useful when you are creating samples from synthesizer sounds.

## Threshold Recording

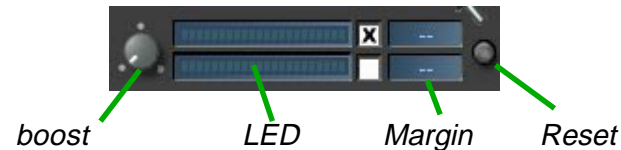


To start recording when the input signal reaches a specified audio threshold level click on the **dB** button. Recording will begin as soon as the signal reaches or exceeds the level set in the **Threshold** field.

When recording is started either by MIDI control or level control, you can use the **PreRec** feature. This controls how much of the signal will be included in the sample before the technical record start point. Use this feature to avoid missing important attacks, especially when sampling percussive instruments.

## Adjusting the Input Signal

The STS 5000 provides an input gain amplifier to boost the incoming signal up to 12 dB.



The level meters, in the form of LED chains, give you a rough idea of the appropriateness of the input level. For more precise control, use the information in the **Margin** display. The margin should approach, but not reach, 0dB. If the margin reads 0dB, adjust the input level down a little, and reset the margin display (small button to the right). Continue monitoring the margin and making adjustments to the input level until 0dB is rarely reached (if at all).

When recording a mono sample you can use the small option box to the right of each LED chain to choose which channel to use for recording.

## Terminating the Recording

To stop recording, click on the Stop button.



Confirm whether you would like to save the recording, or if you want to try again.

The STS 5000 uses the computer's hard disk to record and save samples. A disk can accommodate very large WAV files - much larger than you could actually use in a sample program. Just how large a sample can be in your system depends on many factors, and so cannot be quantified accurately. Note that the STS 5000, your operating system, and all other applications running on your computer must share system memory. What you have available is what is left after taking all this into account.



# Your First Sampler Program

## Sample Editing

It is rare that a sample recording is perfect to begin with. After recording you will most likely need to optimize the sample by editing out unnecessary parts, normalizing, etc.

For example, there is often some unnecessary empty space at the beginning of the sample. To eliminate it, select the empty area and use the **Delete** function from the menu (or by using <Ctrl+X>/<Apple+X>).

If there is only a small amount of empty space at the beginning of the sample, you can simply shift the sample's start inset. To the far left in the editor window you will find a moveable white line. This indicates the start inset of the sample - the point at which play begins when the sample is triggered. If you now click on **Play**, playback begins immediately at the new start inset.

In order to make precise edits, it is a good idea to increase the zoom level to provide a tighter view of the work area.

It's a good idea to select a starting time for the sample that is at a point where the sample word value is as close to zero as possible (zero crossing point). This will prevent any possible clicks or pops when the sample starts. Use the co-ordinate cursor to help find an appropriate position and value.

Level values within +/- 300 of 0 are close enough that no clicks should manifest themselves in the sample playback. Listen to the sample in the editor and vary the start inset until you are happy with the result.

After trimming the beginning of the sample, go to the end and do the same thing, using the same criteria.

If your sample contains a loop, you may also want to delete some unnecessary portions of the signal that lie behind it (after you have firmly established the loop).

## Level Optimization

All samples should be saved at the maximum possible volume level. You can later specify the sample's actual playback level in its zone (Main).

Before using the **Normalize** (Menu: Level) function to maximize the level it is a good idea to first remove any possible DC components using the **DCOffset** (Menu: Level) function. Then proceed with the normalization.

For these operations select the entire sample. Do this using either <Ctrl+A>/<Apple+A> or the **Select All** menu function (Menu: Select).

## Loops

Looping plays through a range of the sample repeatedly to provide the main 'body' of the instrument. The technique was introduced primarily to save precious memory in the early days, but it is useful also in adding the ability to control the duration of the sound. Looping makes use of the phenomenon that the characteristic sound of an instrument is defined during the initial attack - when the sound changes rapidly. Thereafter the sound 'settles down' to a more steady state (i.e. when the performer continues to blow). It is during this steady period that a loop can be used effectively.

The loop points and length depend greatly on the sonic material. A bass sample, for example, has a short attack phase after which the sound changes little as the amplitude decreases.

If a sample contains slow, continuous modulation such as vibrato, this must be taken into account when looping. Otherwise the looped portion of the sample may sound sterile and lifeless (too short a loop that does not include the vibrato) or rhythmically clumsy (when the rhythm of the modulation was not taken into account).

## Setting a Loop

Editing a loop is quite easy thanks to the graphic display, and the editors auxiliary functions.

When a sample is first recorded, no loop is defined.

If you want to include a loop in the sample (not all samples have them) then select **Init** from the Loop menu. A loop is created that starts at the beginning of the sample, and ends at the sample end.

Drag the loop start marker (green line) to a meaningful position. This should be after the attack phase, and at a zero crossing point.

Move the loop end marker (red line) to a position that appears appropriate (there are visual 'clues', due to modulation, that suggest a likely position).

Zoom in on the sample to fine tune the positioning of the loop's end point.

The **Snap** function in the **Loop** menu is useful here. It ensures that the end point will be located at a relatively meaningful position.

The STS 5000 provides a visual aid to help evaluate the loop alignment. Enable the **Splitter** option in the **View** menu and then select **Jump** in the **Loop** menu. The loop start and end points are now displayed such that it is easy to see their relationship to one another. The loop end point is shown on the left side, and the start point is shown contiguous to it on the right side.

A zero crossing is not the only useful loop boundary. Any positions which create a continuous waveform shape are appropriate.

In the editor, click on **Play** to hear the result. The sample will play from the beginning, but will jump back to the loop start from the loop end repeatedly. This will continue until you press the **Stop** button.

## Using Time Stretching and Pitch Shifting

Time stretching and pitch shifting—two powerful and related audio processing technologies—are invaluable in contemporary music production. But to use them effectively and creatively you'll need to acquire some knowledge and experience. This section of the manual provides some approaches to working with time stretching and pitch shifting that should help get you on your way. Treat the following examples as basic starting points from which to develop your own novel and creative working techniques.

The examples are provided in a tutorial format. The first part of the first tutorial is quite detailed—intended mainly for new users. If you are an experienced user you can skip over Part 1: Preliminaries, which deals only with creating a new program, setting keygroups, and loading samples.

All examples use the supplied 'Ultimate Sample Collection' CD, so keep it handy.

When working through the examples it's best to start by creating a new project and loading a 'clean' STS-5000 (i.e. no programs loaded into the sampler). Load the sampler into the Routing window, connect it to the MIDI interface you normally use, and connect the stereo outputs (**L** and **R**) to the module providing audio signals to your monitoring system.

## Example 1: Time stretching

### Part 1: Preliminaries

For the first example we'll load a stereo drum loop in the Akai format, and apply time stretching to it. This is a simple example, but the processing, when applied to stereo Akai samples, results in changes to the sonic character (explained in the third part of this example).

Open the STS-5000's main panel by double clicking on its module representation in the Routing window. You can also open it by clicking on the module with the right mouse button ('Ctrl'+ mouse button in Mac version) and selecting **Surfaces->Open STS 5000** from the popup menu. The main panel with its 16 program slots appears.

In order to load the samples you must first create a new program. Right click (Mac: 'Ctrl'+ click) in one of the 16 slots in the area colored dark blue and select **New** from the popup menu. Within a second or two the line in the Program column for the slot you chose will change to read 'New Program'.

The next thing to do is create a key group. Open the Keygroups dialog by clicking on the light-gray KeyGroups text in the lower border of the front panel. In this dialog, as in the main panel, you can right-click (Mac: 'Ctrl'+ mouse button) in the dark blue area to call a popup menu. Select **New** to create a new key group.

Finally, before loading the sample, open the Options drawer by clicking on the Options text in the lower left corner of the KeyGroupList window. This drawer contains optional settings for the currently selected key group. The option view you need now—so you can load the samples—is **Zones**. Click on the Zones text in the lower border area of the Options drawer.

Now it's time to load the samples. Insert the provided sample CD into the CD-ROM drive and change to the appropriate drive letter in the File Browser. The samples we're looking for are located in the 'ACID JAZZ' directory. Click on the 'ACID JAZZ' folder to open the directory.

*Sometimes it happens that a directory appears empty when you first open it. In this case it is likely that the browser's filter function is set not to show the particular filetype the directory contains. To set the various filter functions, see the Program Dialogs section in the reference manual.*

Scroll down in the directory until the samples 'JZ90DRUM01-L' and 'JZ90DRUM01-R' appear in the listing. In the AKAI sample format, stereo samples are always stored in two files, one for the left channel (appended with '-L') and one for the right ('-R').

Click on the sample named 'JZ90DRUM01-L'. While holding the mouse button down, drag the file out of the File Browser. The mouse pointer should change to a curved arrow and will be 'crossed out'. As you move the mouse pointer into the dark blue area of the Options drawer, the curved arrow pointer no longer remains crossed out, indicating that it is now possible to drop the sample. Release the sample in the first line under the Sample column. After a brief moment, the sample name appears there.

In the same way, drag the sample 'JZ90DRUM01-R' into the Options drawer, but drop it into the second line. Each line in this view of the Options drawer represents a Zone, the term we will use from now on.

If everything's connected properly, and your monitoring system is up and running, you should hear a drum loop play back when you play a note on your MIDI keyboard.

Although we loaded a stereo sample, it plays in mono until we adjust the left/right balance of the two samples. This is done in the Main submenu in the Zones view using the **Pan** parameter. If you've followed exactly the procedure so far, you should already be at the Main submenu, and the pan controls should be available in the Options drawer at the far right side of the dark blue editing area. If you don't see them, you may be in another Zones submenu. If so, select the Main submenu by clicking on the text, Main, in the lower brown border of the editing area. Now the pan parameter controls should be showing.

Set the pan for the left sample to -50, or far left, and for the right sample to +50, far right. Adjust the pan values either by clicking on the field and dragging the mouse pointer (vertical movement = coarse changes, horizontal movement = fine changes) or by entering the value directly into the text fields. If you cannot input any values, it means the key group is not currently selected. Click on the appropriate keyboard representation in the KeyGroupList to re-enable the Zones view so you can enter values.

When you play the loop after adjusting the pan settings as above, you'll hear it in stereo. You'll also notice that both the pitch and the tempo change when you play different notes (it plays back at the original pitch and tempo when you play middle C). This is now about to change...

## Part 2: Applying Time Stretching

For those of you, such as advanced STS users, who skipped over the first part, here's a brief summary of what we've covered so far. This is simply to ensure that we've all covered the same material and can now proceed together.

After loading the STS-5000 module and making the required MIDI and audio connections, we created a new program using **New** in the KeyGroups view. Into Zone 1 we loaded the sample named 'JZ90DRUM01-L', and into Zone 2 the sample 'JZ90DRUM01-R'. These samples are found in the 'ACID JAZZ' directory on the 'Ultimate Sample Collection' CD-ROM. The pan settings were adjusted to hard left and hard right as appropriate. As we continue on into the second part, we will refer exclusively to this initialized program.

Before applying time stretching to a sample, the sample should be analyzed using the **Calculate Pitch** function. This function determines the fundamental pitch to be used for computation purposes. To analyze a sample, open its popup menu by right clicking (Mac: 'Ctrl'+ click) on the name of the sample. Three analysis modes appear in the menu: **Voice**, **Instrument**, and **Extra**. These designations help to choose the algorithm best suited for the particular material to be processed. In general you should try all three and decide for yourself, after listening, which one produces the best result.

Once you've selected an analysis mode, you must choose whether to perform the analysis only on the selected sample, on all samples in the key group, or on all samples in the program. For this example, select **Calc Pitch > Instrument > of keygroup**. Now both samples, JZ90DRUM01-L/R will be analyzed simultaneously. The progress of the analysis is displayed in a progress bar, and, for these samples, it won't take very long.

Now we can apply time stretching to the samples. Time stretching is found in the Special Zones submenu, so switch to it now by clicking on **Special** in the brown border just beneath the Option drawer's blue editing area.

One of the columns in this submenu is labeled, **Pitch Mode**. For each sample, click on the text in this column and drag the mouse up or down to select the mode **PitchShift**. Make sure to do this for both samples. Selecting *PitchShift* may seem confusing, but this is the mode to use for time stretching.

Now, for the first time, you can play the samples with pitch shifting/time stretching applied to them. Start at middle C. At this pitch you hear the original pitch and tempo at which the sample was recorded. But now, when you play another key, the tempo remains the same—only the pitch changes. This may impress you already, but that's not the effect we're after here. We want time stretching, and some additional adjustments are yet to be made.



### Part 3: MIDI Controlled Time Stretching

Another column in the editing area is labeled Key Tracking. Using the same method you used to change the pitch mode, change the Key Tracking option from **Track** to **Const** (click on the field and move the mouse until *Const* appears in the field). Do this for both samples. Now, no matter what note you play, both the pitch and the tempo play back as originally recorded.

A little further to the right you'll see a column labeled Timestretch. The controls in this column let you slow down or accelerate the loop to adapt the tempo to the required conditions without changing the pitch. Click and drag the relative tempo indicator line, or enter values directly into the text field from the computer keyboard. The next time you hit a key (any key) the playback speed will have changed. Play with some different time stretch settings before proceeding to Part 3.

The method described above is often too static for some of the ways you can probably think of to use time stretching. To make time stretching even more interesting, the STS-5000 lets you control it using arbitrary MIDI controllers. With stereo samples, however, there are a couple of things to be aware of.

The drum loop we've been using consists of two separate samples, each of which is processed separately by the algorithm. This places a heavier demand upon the computer than would an equivalent stereo sample in WAV format. It's generally preferable to use a single stereo sample in place of two mono samples, but especially when time-stretching is continually varied under MIDI control. The mono samples can be converted into a stereo sample as follows:

To get around this, you can create a single stereo sample in the .WAV format from the two Akai samples. With a single stereo sample file the phase relationship remains stable during playback, even with dynamic time stretching.

Select the appropriate key group (by clicking on the keyboard graphic in the KeyGroupList window) to register the desired samples. Select the first sample as usual, by clicking on it with the (left in PC version) mouse button. The sample name will now be highlighted in light blue. Now press the **<Ctrl>** key on the computer keyboard and click on the second sample—the one to be merged along with the first into a single file. Both samples should now be highlighted. Right click on one of the samples and select **Convert to stereo** from the popup menu. This brings up a file selector where you must specify a filename and directory in which to save the new stereo .wav sample file.

Delete the Akai samples from the Zones list and replace them with the newly created .wav sample. To delete a sample from the list, highlight it and press the computer's **<Del>/<NumLock>** key. Load the new sample by dragging it into a zone from the File Browser, as usual. If you drag it into the same zone that an Akai sample previously occupied, all the parameter settings will remain the same. However, you should again run the **Calc Pitch** function to optimize time stretching for the new .wav sample.

Now we need to select a controller to use for time stretching, and for this example we'll use the pitch bender. So that the pitch doesn't change during playback, we'll disable global pitch bend modulation for this program.

On the STS-5000's main panel click on Program to open the Program drawer. In this drawer, select **Pitch** and set the BendWheel **Up** and **Down** values each to 0. Now the pitch won't change when we use the bend wheel to control the tempo of the drum loop.

Return to the KeyGroupList window's Options drawer and click on the Timestretch option in the lower border. Under Timestretching you will see three entries you can use to assign up to three different controllers. All indicate *No Source*. Click on one of the entries and select **Bend** from the list of possible controllers. You've just assigned the pitch bend controller to control time stretching. Set the associated text field on the right to a nominal value of, say, **25**.

Now when you play the drum loop you can use the pitch wheel to increase the tempo (up) or decrease it (down). In the central position, of course, the loop plays back at its original tempo.

That's it for the first example, but here are some hints and tips for further investigation:

- in place of a controller use one of the LFOs to modulate timestretching
- enhance the groove by skillfully setting controller values and recording them with the help of a sequencer.
- use more than one modulation source, e.g. an envelope generator and an LFO together.

## Example 2: Pitch Shifting

### Part 1: Simple Pitch Shifting

This example assumes you have already read the first one, or are otherwise fairly well-acquainted with the STS-5000.

The basic sample material for this example also comes from the 'ACID JAZZ' directory on the 'Ultimate Sample Collection' CD. Before loading the sample, create a new program and a new key group. In zone 1 of the key group, load the sample, 'JZ90BAF01'. When you play this sample you'll hear a bass playing a phrase in the key of F. If you can't identify the key signature by ear (not many of us can) note that the base pitch is indicated in the name of the sample. It is important to know the base pitch as you'll see in the next section.

You'll notice that the sample plays back at its original pitch only at middle C. The original, however, is in the key of F. For the sample to actually play back in the key of C when the C key is pressed, we have to change its base pitch.

Click on Zones in the Options window (if necessary) and then on Sample (in the area bordered by the small white box).

The third column from the left is the Key column, with default values set to C3. This indicates the key assigned to play back the sample at its originally recorded pitch. In order for this sample to play back at its original pitch when the corresponding key (in terms of pitch) is pressed, set the **Key** value for the sample to F2. Now the sample plays back in F when an F key is pressed (and also at the appropriate pitches for the other keys). It's always important to know the original pitch of a sample, as it also serves as the basis for the maximum possible transposition of the sample in Formant mode (+/- 4 octaves from the original pitch).

If you play the sample above the original pitch, it plays back faster than the original. And when you play it below the original pitch, it plays more slowly. However, the real-time pitch shifting feature of the STS-5000 can change all that.

First, again analyze the sample using the **Calc Pitch** function. Select **Instrument** and choose **of selected**. Now click on **Special** in the Zones submenu selection area, and in the Pitch Mode column select **PitchShift** for the selected sample. Now when you transpose the samples by playing the keyboard, each key plays back at the same speed, but with a different pitch. How about that! Well, it gets even better...

Although this instrument sounds good at lower pitches, the tonal character changes when you play it in higher registers—it gets thin and 'twangy' sounding. If you notice an undesirable effect like this when you move up the keyboard, try setting pitch shifting to **Formant** in the Pitch Mode column.

In Formant mode you'll notice that pitches above the original pitch remain natural sounding, but those below don't, unfortunately (we'll address this in Part 2, though).

## Part 2: The Different Pitch Modes

If a sample sounds good in one mode for higher pitches, but better in another for pitches lying below the original, it makes sense to use the appropriate mode for each keyboard zone. Since you can set the pitch mode independently for each zone, this can, indeed, be done.

Copy the existing key group by right clicking ('Ctrl'+mouse button in Mac OS) on the keyboard graphic in the KeyGroupList window and selecting **Copy** from the popup menu. Now move the mouse to the dark blue background area and right click again (Mac: 'Ctrl'+mouse button). When the menu opens, select **Paste Keygroup**.

Since the two keygroups now overlap each other completely, we must adjust them. For the first key group set the low key to C-2 (default) and the highest key to F2 (the original pitch of the sample). For the second key group, set the low key to F#2 (where the other one leaves off) and the high key to around F4 or so, since the sample still sounds quite good at this pitch.

Now select the key group that plays the lower octaves and set the Pitch Mode in the zone's Special submenu to **PitchShift**. Select the other key group, and choose **Formant** as the pitch mode. Now when you play this program over several octaves you will see that it has been significantly improved.

### Part 3: Robot Mode

The term 'Robot Mode' may sound a little odd, but as you'll see, this mode is aptly named.

Reset the program to a single keygroup and set the low key to F0 and the high key to F3. Now go to the Special submenu in the Zones view and adjust the Pitch Mode to **Robot**. Play a note on the keyboard—say, C2. The bass plays, but it plays only a single note at the pitch corresponding to the key pressed. However, it does continue to play the rhythm of the sample, as if a robot were playing it for you. To make this mode even more effective, you should also enable Mono/Legato mode.

Open the main panel of the STS-5000 and select the MIDI submenu in the program drawer. Click on the knob designated **MonoLegato** in the lower right side to enable this mode. Now the program is set to mono mode, and by using a legato playing technique, the sample is prevented from retriggering

each time you hit a new note. The pitch changes, but the rhythm remains consistent.

Now you can play the rhythm of the original sample using your own melody. And in perfect time!

So ends the second example tutorial. Again, here are a few pointers for further experimentation:

- use the MIDI controllers for real-time time stretching to vary the rhythm of the phrase.
- set an offset in Formant mode (Formant column in the Special submenu) or even try using a controller to modulate the Formant offset (Formant Modulation in the Timestretch *submenu*).

## Example 3: Pitch Shifting and Auto Chord

This example describes how to use the STS-5000 synthesis and sampling functions to create an entire vocal performance from a single sample.

### Part 1: A Vocal sample in Robot Mode

Create a new program and a new keygroup and set the keygroup to cover the keyboard range from C2 to C4. For this tutorial we'll use the sample named 'RHY LINE 11' from the 'Freestyle' folder on the 'Ultimate Sample Collection' CD. Load this sample into zone 1 of the keygroup (you're getting good at this now!).

When you play this sample you'll hear a female vocalist singing a little 'scat' phrase. We'll show how Robot mode can be used to keep the voice from singing the same line over and over, and we'll use an envelope to correct a minor timing problem at the end of the phrase.

Getting into Robot mode proceeds quite quickly. First analyze the sample (this time using **Calc Pitch > Speech > of selected**). Next, in the Special submenu of the Zones view switch the Pitch Mode from **Resample** to **Robot**. Now, when you play the sample, the vocalist sings the same rhythm, but at a single pitch. You can even play chords using her voice with this rhythm.

You can adjust or correct the timing of the vocalist using an envelope generator to modulate time stretching. Switch to the Timestretch window and choose **Env 3** as the modulation source. Adjust the Intensity to -10 (the value in the text field to the right). Now we'll set the envelope to some specific values we've determined by experimentation.

R1 = 0, L1 = 0

R2 = 52, L2 = 0

R3 = 20, L3 = 60

R4 = 99, L4 = 60

If you play the sample now, the singer's performance is altered to remain at a constant tempo, which was not the case before. To acquaint yourself better with this technique, play around with the envelope settings a little bit and note the results. Before continuing, however, return to the above settings.



## Part 2: Auto Chord Mode

If you play the sample using one note, and a moment later hit another note, the second note starts at the beginning of the rhythmic phrase, creating a 'canon' effect, or a rhythmic disalignment, with the first sample. You may want this sometimes, but if you don't, you can use Auto Chord to prevent it so that each additional voice starts from the current position of the first voice.

To enable *Auto Chord* mode, go back to the STS-5000 main panel and select Program to open the program drawer. Now select Midi 2 and under Sample Trigger Mode you will find the **Auto Chord** option. When the indicator is lit, the option is enabled.

Play a note and subsequently add additional voices. As long as the first key remains pressed, the added voices are triggered not from the beginning of the sample, but from the current position of the first vocal sample.

Example 3 has shown you how to create an entire choir (or jazz chorus) from a single sampled voice, and wraps up this tutorial.

As usual, a few more quick ideas for further investigation:

- use pan with keyboard modulation to create a choir in a stereo field.
- change Env1 and make a note of how Auto Chord reacts to it.
- experiment with the Remote Chord function. This allows you to use a specific note to trigger the sample (for example, a note not in the key group) so you can start playback of a phrase from somewhere in the middle (by first playing the note that doesn't sound, and then a note or notes that fall within the key group).

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