NuEdge development

TYPHOON

version 1.0

User's Manual

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"... a group of rather smart Swedes ... " — *Sound On Sound, October 1993*

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Preface

Typhoon is an entirely new system software for the Yamaha TX16W sampler. You will find few similarities between the original Yamaha operating system and Typhoon. It is therefore advisable to read through this manual to get the most out of the new possibilities.

With Typhoon, the TX16W is no longer merely a sampler. Among the many features of Typhoon there are powerful processing methods that will help you discover new possibilities in sound creation. In spite of some problems with the TX16W hardware, we have eliminated most of the frustrating limitations using advanced software techniques.

All modern samplers use dynamic audio channel allocation and with Typhoon the TX16W is no longer an exception. Our attempt to turn the TX16W into a good modern sampler does not stop there; to make the TX16W even more competitive with its counterparts we have added other innovations such as free modulation (including modulation sources such as LFOs and envelopes), audio file compression (30-50% savings), pretriggered threshold to prevent loss of transients during sampling, advanced algorithms for pitch tracking, wave trimming and loop finding, good stereo handling with pan possibilities and advanced storage utilities (which will ease the creation and exchanging of sound library disks).

With these new features and improvements we hope that the TX16W will live for many years to come. The development of Typhoon will of course continue, aiming for new goals not achieved in this version. You can affect this development process by sending us your comments on the software and this manual. Our primary goal has been to write an easy to use and yet powerful operating system. Hopefully you will share our opinion that this goal has been achieved.

With this piece of software we hope to demonstrate that it is not only the hardware that determines the final product. The science of programming is a vital and powerful part in the development process and it should be treated with the same respect as the hardware.

—— *The Typhoon Development Team (of NuEdge Development)*

Chapter 1

An Overview of the Sound Architecture

1.1   Basic Items

The sound architecture is built upon three categories of **items**. These are **waves**, **voices** and **performances**. Each category is provided with a list wherein the **items** themselves are stored, and the lists grow and shrink as necessary. "Empty spaces" are not created when **items** are removed and new **items** are added to the end of the list.

All the **items** are accessable through their numbers and you can give them names of up to eight uppercase characters. Two totally different items are allowed to have identical names, although it is not advisable (see Fig. 1.1).

Performances	Voices	Waves
001:TECHNO 002:JARRE 003:MOZART 004:VANGELIS	001:PIANO 002:STRINGS 003:FLUTE 004:PIPEORG 005:CEMBALO 006:DRUMS	001:HIHAT 002:CHOIR 003:PIANOC3 004:PIANOF3 005:BASSDRUM 006:STRING 007:TEST 008:SNARE 009:TEST
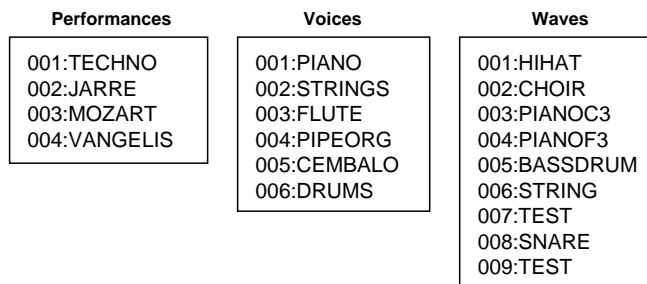
Figure 1.1: Categories of items and their lists

The different types of **items** have different purposes. The **waves** represent single pieces of sound such as a drum or a key of a piano. The **voices** typically represent instruments, e.g. a flute. Finally, **voices** are grouped together in **performances** so that several **voices** can be played simultaneously.

1.1.1   The Item Hierarchy

Items may use other **items**. For example, as we previously said, a **performance** is built upon a number of **voices**. Thus, a **performance** uses **voice** items. Similarly, a **voice** uses **waves** to describe the sounds for the various keys of the keyboard. There is no restriction on how many times an **item** may be used; an **item** may be intensively shared. Therefore, the collection of all the **items** form a complex **item hierarchy** (see Fig. 1.2).
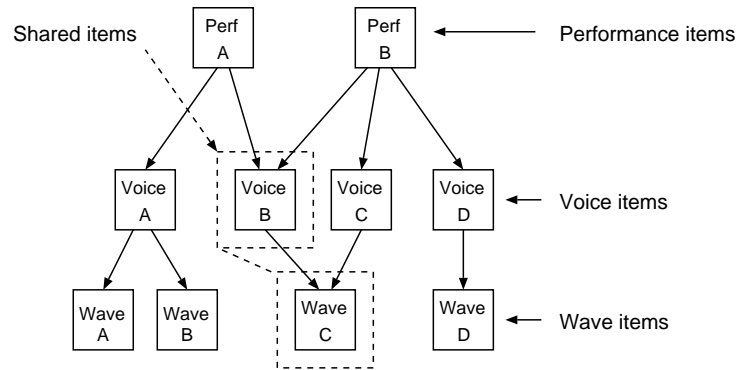
Figure 1.2: The item hierarchy

1.2   The Wave

Waves are the most fundamental items in Typhoon. They represent single pieces of sound, e.g. a snare drum or a key of a piano, and can be created by sampling a sound source.

The sampling process can be thought of as taking instant "snap-shots" of the "stream of sound." The snap-shots are called **sample points** (or sometimes **samples** for short). With several such sampling-points the original sound can be reconstructed by "guessing" what the periods in between the points contain, e.g. by drawing straight lines between them. (There are several other methods of "guessing," which is technically known as **interpolation**.) A higher sample rate (i.e. taking snap-shots more frequently) makes the reconstruction of the sound more accurate (see Fig. 1.3). Thus, higher sample rates result in better quality, but the trade off is the consumption of more memory.
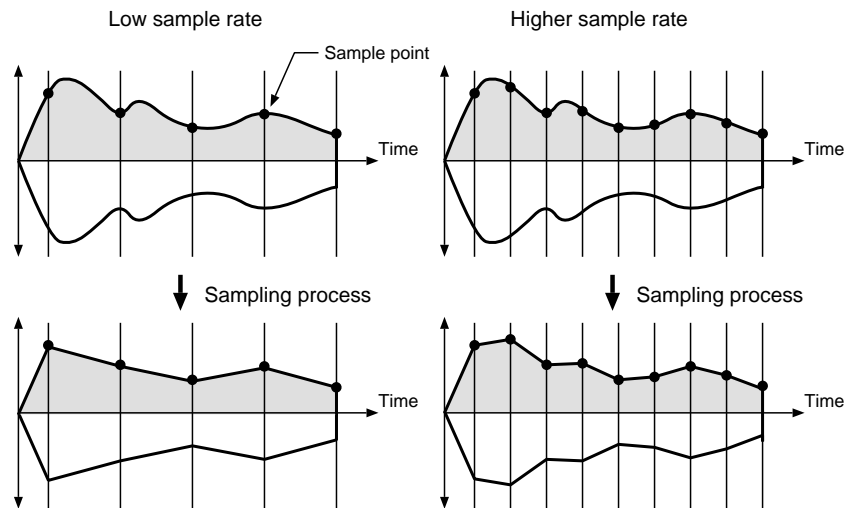
Figure 1.3: The sampling process

Besides the (sampled) audio data, other information such as pitch and length are also stored in the wave (see Fig. 1.4).
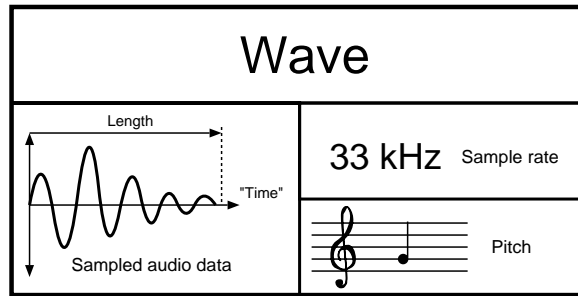
Figure 1.4: The wave

1.2.1 The Pitch

The pitch of the sound is automatically detected by Typhoon during sampling, but you can also manually set it to another value. Some sounds are pitchless by their nature and these can be specially treated as pitchless sounds by setting their pitch to "none." The correct pitch will always be played provided the pitch information in the wave of the sampled data is correct.

1.2.2 The Loop

The "loop" is an area of the wave that is continuously repeated until the wave stops playing. Unlike many other popular sampling synthesizers today, the TX16W does not support looping between two specific points; instead the loop is always an area at the end of the wave (see Fig. 1.5).
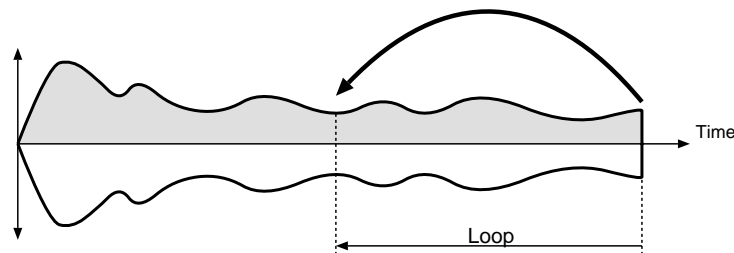
Figure 1.5: The loop of a wave

1.2.3 Stereo Waves

Stereo waves are treated and edited as single waves in Typhoon; there are no separate "left" and "right" waves for the left and the right speakers. The preference to treat stereo waves as single waves is well grounded when stereo waves are edited. For example, if a stereo wave is to be looped you do <u>not</u> have to independently loop two separate waves.

1.3   The Voice and the Parameters of the Groups

In Typhoon **voices** represent instruments, e.g. a drum kit or a piano, and to provide all the necessary features an instrument may have, the number of parameters is large.

A voice is partitioned into **groups** where each group represents a part of the sound that the **voice** can produce. There are instruments that can be defined with a single group only, but as soon as we want to define more complex instruments the need for several groups is obvious.

The term **group** is actually short-hand for "group of parameters." By setting the appropriate parameters you can obtain a large number of instruments. It should be pointed out that setting the appropriate parameters is a difficult process which requires insight and experience, but once you have this experience the possibilities are almost endless.

The parameters for each group are divided into 14 categories as shown in Fig. 1.6. First we shall study two important parameters; the key and velocity ranges.
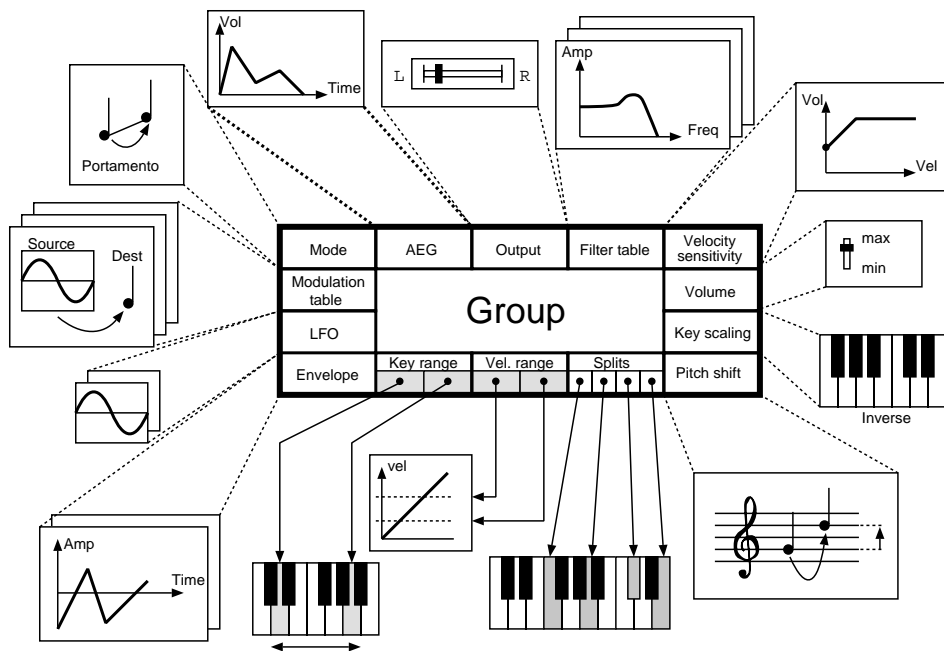
Figure 1.6: Available parameters of the group

1.3.1   The Key and Velocity Ranges

The key and velocity ranges specify what keys and velocities a group shall respond to. If a received MIDI note appears to be within these ranges, the group is played.

We can visualize this property in a key-velocity diagram as shown in Fig. 1.7. One axis denotes the key number and the other axis denotes the key velocity. The group can then be thought of as an allocated rectangular area representing the total key and velocity range (see Fig. 1.7).

Typically a group plays only one wave and the wave to be played is a single parameter of the group (see Fig. 1.8).

By the use of several such groups you can create a multi-sampled instrument, where each group is bound to one wave (see Fig. 1.9). However, there is a hidden disadvantage: Usually the groups of a multi-sampled instrument are using similar parameter settings and it may become quite cumbersome to change all the individual parameters whenever changes are made to the complete instrument. For example, to change the envelope of the instrument you would have to change
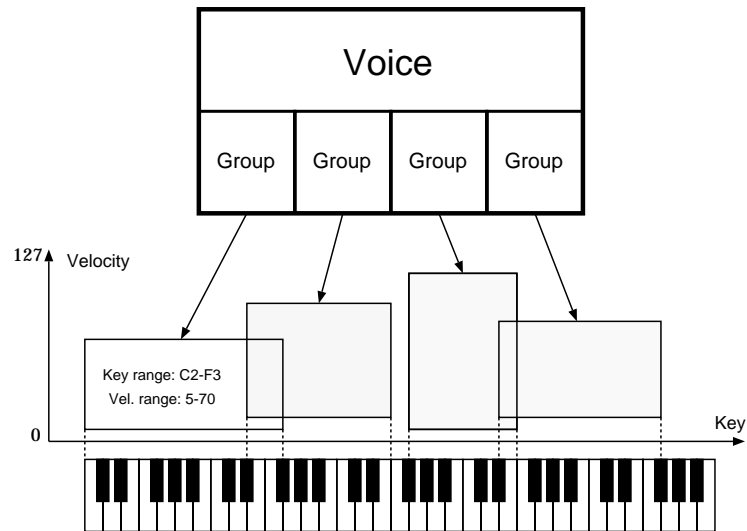
Figure 1.7: Key-velocity diagram
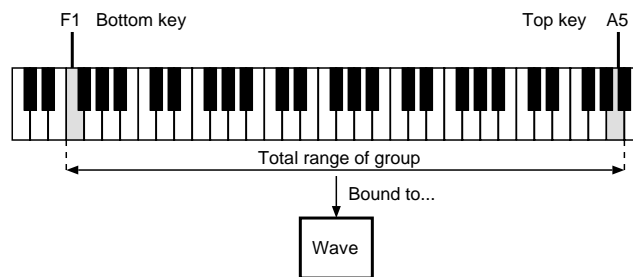
Figure 1.8: Single wave bound to the key range of the group

the envelope parameters for each and every group. Thus, it would be much more convienient if a multi-sampled instrument could be defined within one single group. To make this possible, Typhoon provides **splits**.
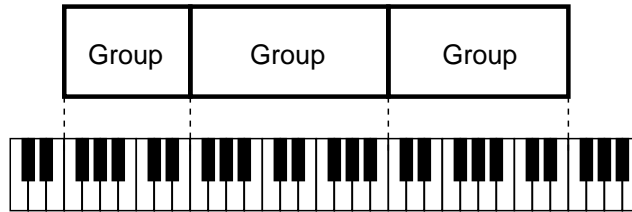
Figure 1.9: Creating a multi-sampled instrument with groups

1.3.2   Splits

The key range of the group can be split into several subranges called **splits** and the splits are separated by **split points**. Each **split** is bound to a **wave** and by the use of several such splits you can easily obtain a multi-sampled instrument (see Fig. 1.10).

The advantage of defining multi-sampled instruments using this method is that all the sounds defined by the splits share the same parameters. Thus, to change the envelope of the instrument you would only have to change one group parameter.
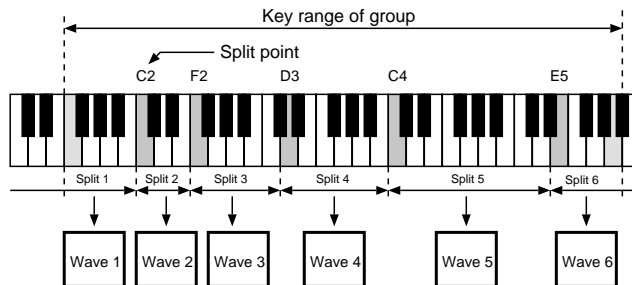
Figure 1.10: Splitting the range

1.3.3   The Pitch

If the **wave** contains information about its pitch, the correct pitch will always be played by the **group**. However, sometimes there can be reasons to shift the pitches of the waves in use by the group without changing the actual pitch information of the wave. Therefore, each group is equipped with a pitch shifter.

The pitch shifter expresses the amount of shifting the **waves** from their original pitches in **octaves**, **semitones** (twelve semitones correspond to one octave) and **cents** (100 cents correspond to one semitone). Figure 1.11 illustrates this parameter.

Some waves are pitchless by their nature (e.g. snare drums) and it is meaningless to assign any pitch but "none." In this case the convention is to let the middle key of a range denote the original "rate." Keys on the left hand side play lower pitches and the contrary for the right hand side (see Fig. 1.12).
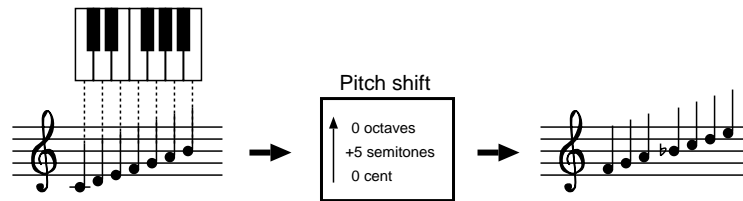
Figure 1.11: The pitch shifter

Note: Typhoon will always compute the middle keys of the <u>effective</u> ranges; consideration to split ranges are taken into account.
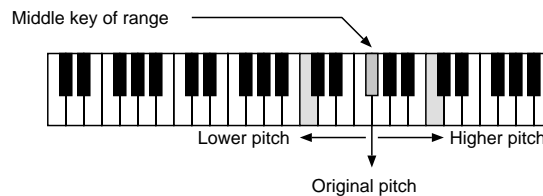
Figure 1.12: The "pitch" played when using pitchless waves

1.3.4 The AEG (Amplitude Envelope Generator)

Once the group is playing its volume is determined by the AEG (Amplitude Envelope Generator). The AEG describes the volume distributed over time and its shape is specified by certain parameters as shown in figure 1.13.
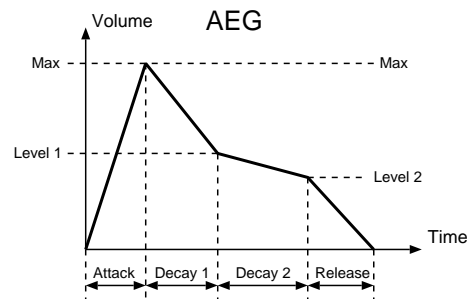
Figure 1.13: The AEG

1.3.5 Modulations and the Modulation Table

Typhoon provides you with an enormous amount of flexibility in changing parameters in real time. The concept of varying a parameter with a chosen source is called a **modulation** (see Fig. 1.14).

Varying the pitch with the pitch wheel is no doubt a very familiar modulation. There are other modulations as well and the types of modulations are programmed in a similar fashion, namely
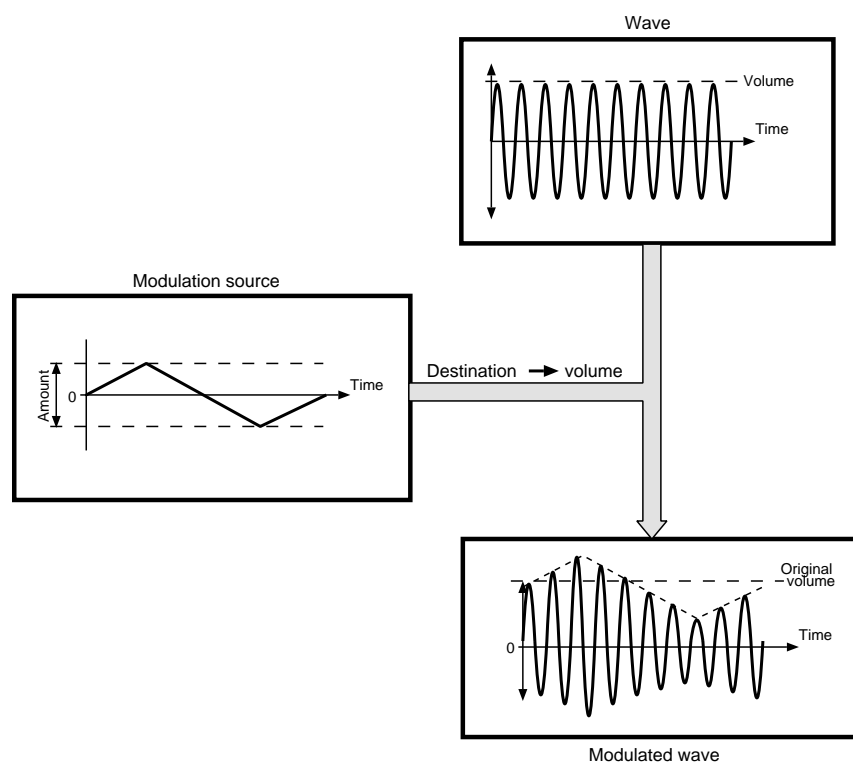
Figure 1.14: Illustrating modulation

by pairwise **source** and **destination** entries. Thus, the modulation of varying the pitch with the pitch wheel is simply obtained by using the **pitch wheel** as **source** and the **pitch shifter** as **destination**. Up to 8 such **source** and **destination modulation entries** can be stored in the **modulation table** of the group (see Fig. 1.15).

Entry	Source	Destination	Amount
#1	Pitch wheel	Pitch shifter	+4 semitones
#2	Mod. wheel	Volume	+100
⋮	⋮	⋮	⋮
#8	Velocity	AEG/attack	-50
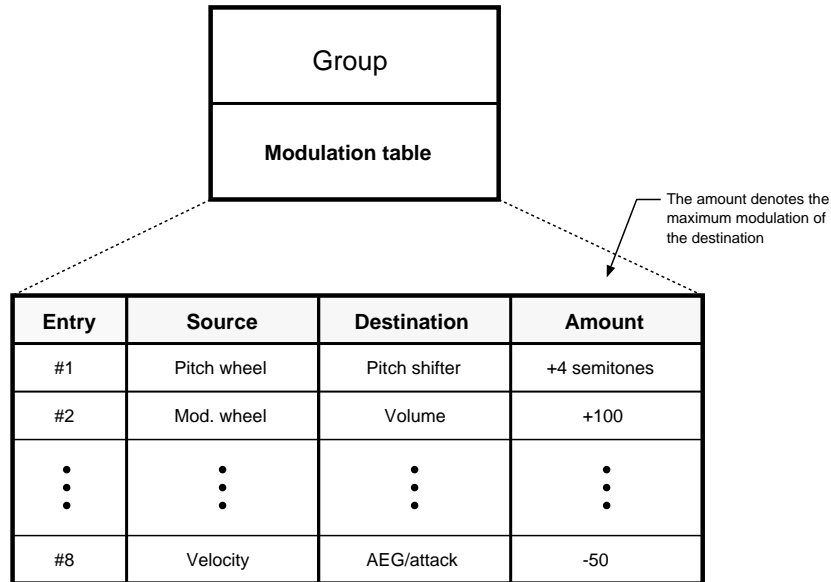
Figure 1.15: The modulation table

Exactly *how* to set up the modulations to obtain a desired effect is a process which requires insight and experience. Thus, patience and practice are required, but once you have this experience the creation of sound becomes much more interesting. For example, the **Typhoon drum kit** (available on the Typhoon system diskette) was created by modulating very simple waves such as pure noise and sine.

The LFO (Low Frequency Oscillator)

Each group is equipped with two user programmable LFO's (Low Frequency Oscillators) which can only be used as modulation sources. An LFO consists of a wave-form that is infinitely repeated in time. Its characteristic is determined by three important parameters: its shape, its rate (frequency) and its amplitude (see Fig. 1.16).

LFOs are quite useful. For example, a vibrato effect is easily achieved by modulating the pitch shifter with the LFO. The rate of the vibrato is then controlled by the rate of the LFO.

The envelope

Also two envelopes are provided for each group. The envelope describes levels distributed over time. It is similar to the AEG, but it is more general, since envelopes can also have negative levels (see Fig. 1.17). Like the LFO, the envelope can only be used as a modulation source but unlike the LFO, the effect of the envelope ceases in a finite amount of time (i.e. when time T1+T2+T3 has expired).

Other Modulation Sources & Destinations

There are many modulation sources and destinations available in Typhoon. The available sources are shown in table 1.1 and the destinations in table 1.2. Check the reference part of the manual
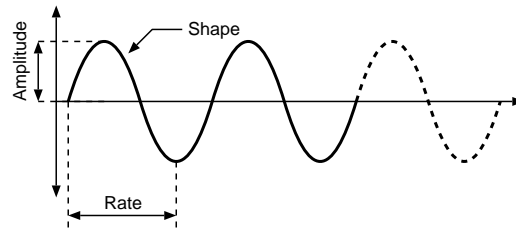
Figure 1.16: The LFO
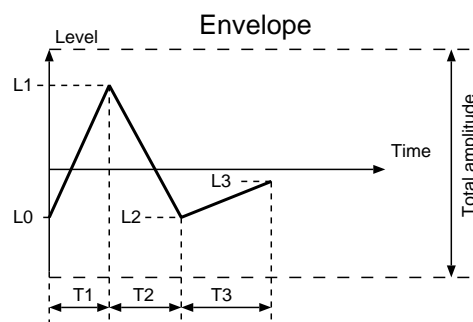
Figure 1.17: The envelope

for further information.

1.4   The Performance

The **performance** is built upon an amount of entries, where each entry represents a **voice** allocated on a certain **MIDI channel** (see Fig. 1.18). The entry is also equipped with a **volume** parameter so that individual volume settings can be specified. There are additional parameters for an entry as well, but check the reference part of the manual for further information.

If a key is received on a MIDI channel, the entries associated with the same MIDI channel will play their voices. This provides both layering (i.e. using several voices on the same MIDI channel) and the multiple use of one voice on several MIDI channel.

1.4.1   The Program Change Table

Each performance is also equipped with its own **program change table**. Once a program change code is received on a MIDI channel the entries associated with that channel will temporarily change their voices.

Number	Source
#1	Keyboard based velocity
#2	Range based velocity
#3	Keyboard based key number
#4	Range based key number
#5	Modulation wheel
#6	Pitch bend wheel
#7	Pitch bend for held keys
#8	External controller #1
#9	External controller #2
#10	Aftertouch (polyphonic aftertouch is also supported)
#11	External input (on the TX16W front panel)
#12	LFO (Low Frequency Oscillator) #1
#13	LFO #2
#14	Envelope #1
#15	Envelope #2

Table 1.1: Available modulation sources

Number	Destination
#1	Pitch shifter
#2	Volume
#3	Filter
#4	Stereo panning
#5	Attack (The attack of the AEG)
#6	AEG/T (The time of the AEG)
#7	Glide (The speed of portamento)
#8	The amplitude parameter of LFO #1
#9	The amplitude parameter of LFO #2
#10	The rate (speed) parameter of LFO #1
#11	The rate (speed) parameter of LFO #2
#12	The amplitude of envelope #1
#13	The amplitude of envelope #2

Table 1.2: Available modulation destinations

Performance
Table of entries

Entry	MIDI channel	Voice		Volume
#1	10	PIANO	• • •	90
#2	10	STRING		70
#3	9	PIANO		100
#4	11	PERCSSN		95
⋮	⋮	⋮		⋮
#n	7	GUITAR	• • •	93
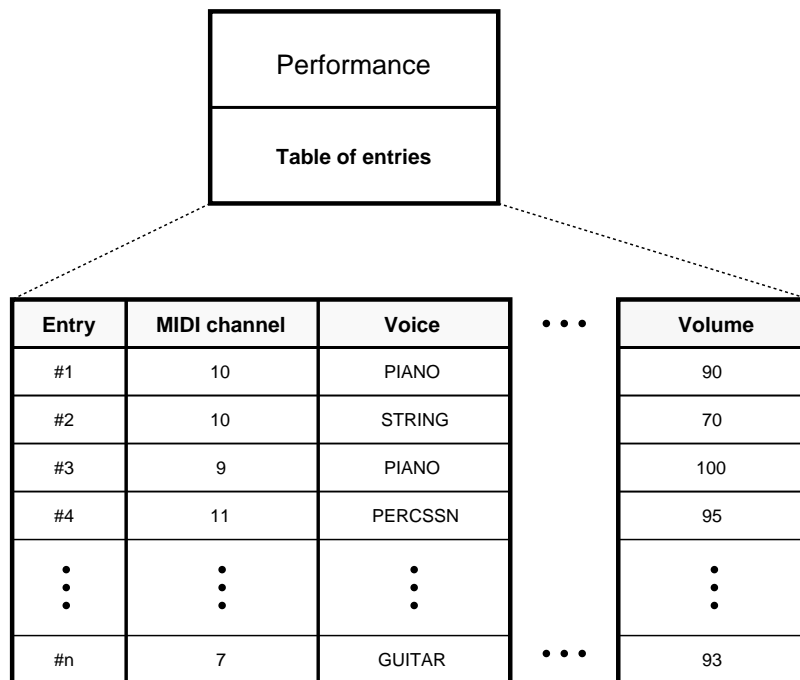
Figure 1.18: Entries of the performance

Chapter 2

The Storage System

2.1   Items & Files

Items in memory are lost if the TX16W is turned off. Therefore Typhoon provides a storage system so that the items can be permanently stored as **files** on diskettes, which later on can be loaded back into memory.

In Typhoon you can save any type of item you wish and it is therefore possible to save a single performance, voice or wave. Furthermore, each item is stored as a single **file** so it becomes easy to load or save separate items, see Fig. 2.1.

The name of the **file** is always the same as the name of the **item** and to prevent confusion it is also advisable that different items are assigned different names.
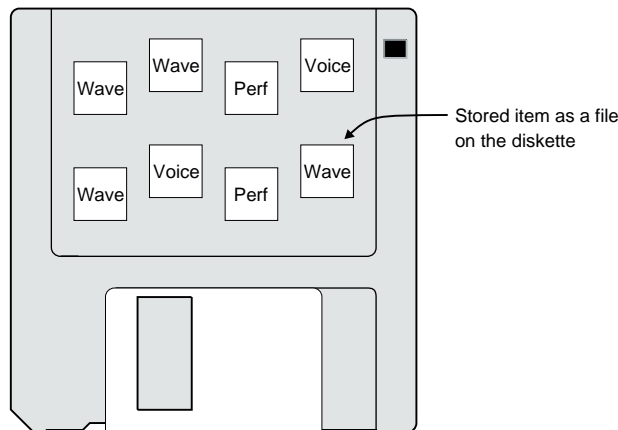
Figure 2.1: Items stored as files

Performance and voice items may be dependent upon other items. In the case of voices, they are dependent upon the waves they are using. Similarly the performances are dependent upon the voices they are using. It is important that the dependent items are available in main memory whenever they are used. To consistently provide this, Typhoon stores the dependencies amongst the items as well as the items themselves. Thus, if a file is loaded and its dependent items are not available in memory, Typhoon will automatically load the required items that are missing. It does not matter if the required items are located on several diskettes as shown in Fig. 2.2.

Note that diskettes can also be named. When an item is stored to or loaded from a diskette Typhoon remembers the name of that diskette. Typhoon can then suggest where to find it if the

item is required during another session. This is especially recommended for those that would like
to build Typhoon sound library diskettes.
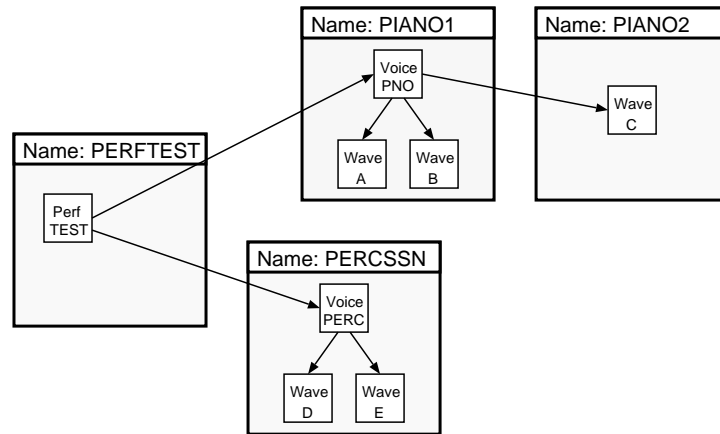
Figure 2.2: Files and their dependencies

2.2   Loading Items into Memory

In Typhoon you can at any time load single files from diskettes into memory. Files they are
dependent upon are automatically loaded, and if they are not available on the current diskette a
message is prompted and you are allowed to switch diskettes. Furthermore, Typhoon will only
load the items that are missing in memory. Items that already are in memory become shared
instead of duplicated (see Fig. 2.3).
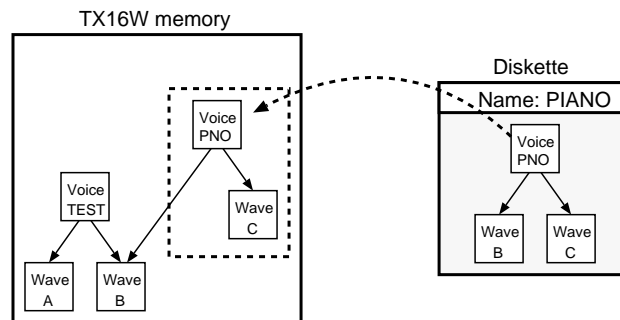
Figure 2.3: Voice loaded into memory

2.3   Saving Items to Diskettes

In Typhoon there are various ways to save an item. The issue is in fact whether to also save the
items it is dependent upon. Typhoon provides you with three different alternatives:

1.None Only the chosen item is saved. The items it is dependent upon are <u>not</u> saved.

2.Unsaved The chosen item, and the items it is dependent upon, are saved if these are presently unsaved (in other words: the items that currently are not available on diskettes).

3.All The chosen item, and the items it is dependent upon, are always saved. (Note: Typhoon has some intelligence. If it discovers that an item being (re)saved already exists on the current diskette, a duplicate will not be created.)

2.3.1 Which Save Option to Use

Which save option to use depends on your intention. The first option **1.None** could be used if you would like to save the item on one diskette and the items it is dependent upon on another.

The second option **2.Unsaved** is perhaps the most commonly used. This option will guarantee in only saving currently unsaved items. For instance, if you have loaded an entire **performance** and made some changes to the voices it is using, the **2.Unsaved** option would guarantee in saving only the changed voices and nothing else.

The third option **3.All** is useful in making a new physical copy of the chosen item and all the items it is using. Note that the **2.Unsaved** option never can provide this. As an example, let us say that you have loaded an entire performance and the items it is dependent upon are spread over several diskettes (as illustrated in Fig. 2.4). Now, suppose that you would like to make a copy of this performance on a new (empty) diskette, so that the items are collected together instead of being spread out. This can be done with the **3.All** option.
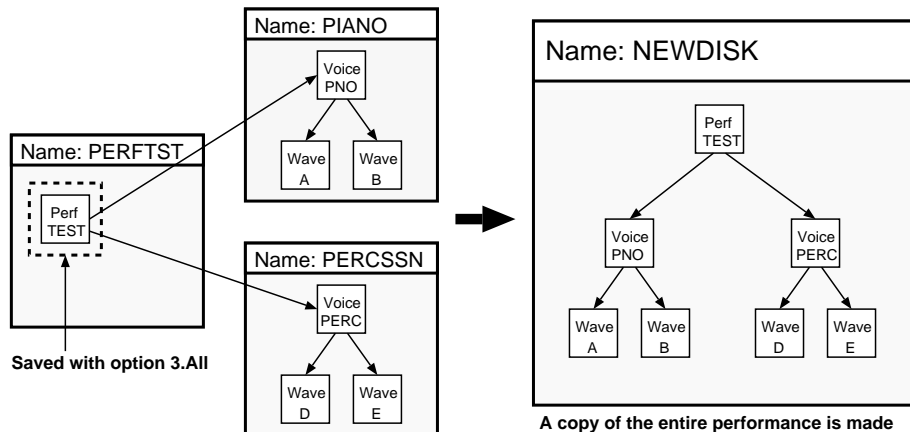
Figure 2.4: Making a copy of the performance

2.3.2 Saving Items on Several Diskettes

Sometimes all items in question do not fit on a single diskette and they must therefore be stored on several diskettes. Whenever there is a lack of space on the current diskette, Typhoon will prompt a message so that you are able to switch diskettes.

2.4 Item Versions

When you modify an item, it will be treated as a new version of the original item. If you do not rename the new version and choose to save it to the same diskette as the original item you have the option of replacing the orginial with the new one. If you do <u>not</u> choose to replace it,

the new version will still be saved and the older one will be left as it is. Be warned though that having many different versions with identical names may become quite confusing. It is <u>strongly</u> recommended that you rename items when significant changes have been made.

Once an item has been renamed it is no longer treated as newer version but as a completely different item.

If, during loading, the correct version of a required item is missing but another one with the same name can be found, you have the opportunity of loading that one instead. This can be practical if you have replaced the version in question with a newer one. In other cases you should use this feature only as a last resort and try to find the correct version instead.

2.5   Saving the Condition of the Machine

As we have mentioned previously, Typhoon can save any single item (and the items it is dependent upon), but it is also possible to save the entire condition of the machine, i.e. all the performances, voices, waves and other parameters that currently are in memory.

The condition is stored as a **setup file** among the items it requires. When a setup file is loaded, Typhoon will clear its memory and reestablish the entire condition.

Chapter 3

The User Interface

3.1 The Front Panel

The front panel of the TX16W consists of a display (40 × 2 characters), a **keypad** of buttons to the right, and a row of **menu buttons** beneath the display.
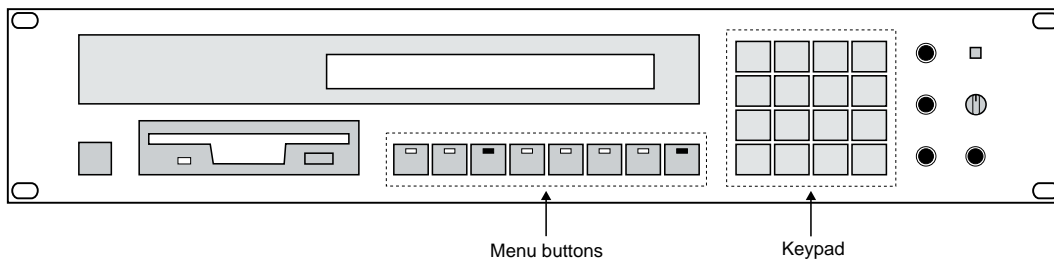
Figure 3.1: The front panel

3.2 The Menu Buttons

The **menu buttons** are used to switch the modes of the user interface (e.g. pressing $\boxed{\texttt{PERFORM EDIT}}$ results in entering the mode of editing performances) and the current mode is indicated by a lit diode. The $\boxed{\texttt{FILTER EDIT}}$ button is obsolete in Typhoon; filter settings are done in $\boxed{\texttt{VOICE EDIT}}$, but the button may be used in future releases of Typhoon.

The rightmost menu button, namely the $\boxed{\texttt{UTILITY}}$ button is quite different from the others. Pressing the $\boxed{\texttt{UTILITY}}$ button enters the utility menu for the current mode.

"Utility mode" is indicated by two simultaneously lit diodes. The menu typically provides utilities for storage, but other kinds of utilities are available as well.

3.3 The Display

The display is rather small and consists of 2 rows, each 40 characters wide. A **cursor** (a flashing ▷) is used to show the current position within the display. By pressing $\boxed{◁}$ and $\boxed{▷}$ you can move the cursor to the left and right respectively.

Often the information does not fit within 40 characters and "scrolling" is used to view different parts. The display can be thought of as a "window" placed upon the displayed information. By scrolling the window to the left or right, different parts of the information become visible. Scrolling is done by constantly moving the **cursor** (▷) to the left or right. Arrows (←, →) are displayed in the left and the rightmost position indicating that there is additional information in that direction.

For example,

```
>Voice        >Grp >Param   ┊>Bot ▷Top →
001:MAXIPERC  01    1.Range  ┊ C2   C7  →
```

According to the above figure, additional information is available to the right due to the displayed arrows. By moving the cursor (▷) further to the right, new information becomes visible:

```
←        >Grp >Param   ┊>Bot >Top >Min ▷Max
←ERC     01    1.Range  ┊ C2   C7     0  127
```

At the same time, a part of the left-hand side disappears. By constantly moving the cursor to the left you will scroll the window again, this time to its previous position. Scrolling is extensively used in Typhoon due to the tiny display, but with some practice you will find it to become quite natural.

3.4   Fields

Generally, fields are places where information is displayed or where functions are selected. Every field has a name and a value, and the ">" character indicates it is enterable with the cursor; if omitted, the field is only used to show unmodifiable information.

```
>Util   ┊Perfs Voices Waves >Delete  >Go
4.Items ┊   1      2     19 1.Unused
```

In the figure shown above, `>Util`, `>Delete` and `>Go` are enterable fields, whereas `Perfs`, `Voices` and `Waves` are fields that only provide the user with information.

The value of a field is determined by its type. In the above example, the leftmost field `>Util` is actually a **menu field**. Menu fields are used to select a particular command or function. To the right of the menu field there is some information about performances, voices and waves. The values of these fields are integer numbers; in this case indicating the number of items available in memory. Continuing to the right, we find another **menu field** named `>Delete`. Finally the rightmost field `>Go` does not have a value at all, but its usage is rather to execute a command; typically the command chosen on the left-hand side.

Consider another example,

```
>Voice        >Grp >Param   ┊>Bot >Top >Min >Max
001:MAXIPERC  01    1.Range  ┊ C3   C3     0  127
```

In this example, `>Voice` is a **value field** denoting the current voice, `>Grp` is another **value field** denoting the current group (of the voice). `>Param` is a **menu field** denoting the current parameter. `>Bot` and `>Top` are **value fields** denoting the key range (used by the group). And at last `>Min` and `>Max` are numerical **value fields** denoting the velocity range.

In Typhoon there exist at least four different types of fields. We can classify them as:

1. Value fields (e.g. `>Bot`, `>Min`)

2. Menu/parameter fields (e.g. `>Param`)

3. Command fields, i.e. fields without values (e.g. `>Go`)

4. Unmodifiable fields (i.e. when the ">" character is omitted).

3.5 Horizontal Hierarchy

It is rather difficult to display all the different parameters at the same time, in fact the tiny display makes it quite impossible. To overcome this dilemma, Typhoon uses a horizontal hierarchy so that the interface still can become user friendly and easy to use. In plain English, this means that issues on the right-hand side are typically determined by the issues on the left-hand side. For instance,

```
>Voice       >Grp >Param   >O >S >Ct >Key scaling
001:MAXIPERC  01   3.Pitch   0 +2  +6  9.normal
```

the information given on the display should be read as follows: The field `>Grp` denotes the current group of the chosen voice, since it is on the right-hand side of `>Voice`. Furthermore, the field `>Param` denotes the current parameter of the chosen group, and at last the parameters themselves are shown to the far right. Note that this structuring is consistent with the rule of horizontal hierarchy:
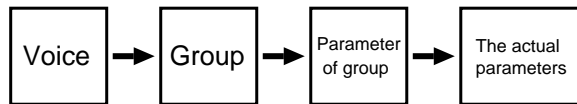
3.6 Editing Field Values

Almost all types of fields can be edited by using the $\boxed{+1}$ and $\boxed{-1}$ buttons. Pressing them typically results in increasing and decreasing the current value respectively. Note: If these buttons are continuously held, the rate of change will accelerate until the button is released.

The numeric buttons available on the keypad are commonly used when editing numeric value fields, but can also be used when editing strings of characters. Editing strings of characters typically arises when editing names of items. For example,

```
>Util    >Voice      >Name          >Go
4.Rename MAXIPERC    DRUMS
```

by pressing $\boxed{\text{ENTER}}$ at field `>Name` you will obtain another cursor which is shown by a constantly flashing underline (_). Pressing a "numeric" button on the keypad results in switching between the characters given on that button. You can also delete characters and insert blank spaces at the current position by pressing $\boxed{-1}$ and $\boxed{+1}$ respectively. Move the cursor out of the field range to exit.

3.7 Editing Features

Typhoon provides a large number of editing features. The data slider on your master keyboard can be configured to slide between different values. This works for all value fields (even for menu fields).

Fields that denote keys or key velocities, can be set by pressing $\boxed{\text{ENTER}}$ once and then press any key on your master keyboard. The key will be interpreted by Typhoon and the value of the field will be set appropriately.

These are the two most prominent editing features. Additional features exist, but we refer you to the reference part of the manual for further information.

3.8   The List Mode

All menu fields, and many value fields, have a special **list mode**. If the field provides this ability, it is entered by simply pressing $\boxed{\texttt{ENTER}}$. The list mode shows a list of all the values that the field can provide. Use the cursor to choose between the listed items, and press $\boxed{\texttt{ENTER}}$ to change the value of the field to the chosen item, or escape it (without choosing anything) by pressing the approriate **menu button**.

> **Note:** By pressing a keypad button, you can jump to items whose names begin with any of the letters on that button.

The **list mode** is available <u>almost everywhere</u> in Typhoon. To find out whenever it is possible to obtain a list of items, press $\boxed{\texttt{ENTER}}$ and see what happens.

For example,

```
▷Voice        >Grp >Param  ┊>Bot >Top >Min >Max
001:MAXIPERC  01   1.Range ┊ C3   C3     0  127
```

Pressing $\boxed{\texttt{ENTER}}$ (please note the position of the cursor ▷) brings you a list of the available voices in memory:

```
Voice                    Copy [+1]
>MAXIPERC ▷ZSTRING >PIANO >CHOIR
```

Typically other convienient utilities are available in **list mode**. In this case you can make duplicates of the selected voice by pressing $\boxed{\texttt{+1}}$.

> **Note:** In list modes, where other utilities are available (such as copying voices), you can always perform these utilities <u>without</u> entering list mode. The short cut is obtained by pressing $\boxed{\texttt{ENTER}}$, keeping it held, and pressing the appropriate button to perform the function. In the above example, pressing $\boxed{\texttt{ENTER}}$, keeping it held and then pressing $\boxed{\texttt{+1}}$ would make a copy of the selected voice.

3.9   Monitor Mode

Normally Typhoon follows the rule "what you see (on the display) is what you hear." However, if a menu button is pressed twice, its diode will become constantly flashing; indicating that you have entered the **monitor mode**. (Exit the monitor mode by pressing the same menu button again.) This means that keys are interpreted globally, so that the sound to be played is determined by the currently selected **performance** in **performance select**.

3.10   "Fast Jumps"

Sometimes it is hard to find the appropriate structure representing the sound produced by a certain keypress. So called "fast jumps" are provided to ease this procedure. By pressing the **menu button**, keeping it held, and then pressing a key on the master keyboard, Typhoon will automatically "jump" to the structure representing the sound that was produced by that key. If the key is "ambiguous," i.e. there are several structures allocated on the same key, you can switch between them by pressing the same key several times.

For example, suppose we have a voice, where two of its groups are layered upon each other. The key ranges of both the groups are `C2` to `C4`.

In this example, we then press the $\boxed{\texttt{VOICE EDIT}}$ button, keep it held, and press the key `D3` on the keyboard. Typhoon will jump to one of the two groups that was played by that key.

```
▷Voice        >Grp >Param   ┊>Bot >Top >Min >Max
001:STRINGS   01    1.Range ┊ C2   C4     0  127
```

If we were to press the same key again. Typhoon would jump to the next of the two groups:

```
▷Voice        >Grp >Param   ┊>Bot >Top >Min >Max
001:STRINGS   02    1.Range ┊ C2   C4     0  127
```

"Fast jumps" can be performed almost everywhere in Typhoon; consideration to **monitor mode** is also taken into account. Generally, the rule is: "What you hear is what you get."

3.11   Item Name Extensions

Names of **stereo** items are extended with the subscript "$_2$". For example,

```
>Wave         >Func    ┊>Start >End   >Auto >Go
001:BELL₂     1.Trim   ┊     0   3373
```

Names of modified items (or items that have not yet been saved) are extended with the superscript "$^\times$". For example,

```
>Wave         >Func    ┊>Start >End   >Auto >Go
002:KICK^×    1.Trim   ┊     0   1270
```

Chapter 4

Reference Manual

4.1 Performance Select

```
>Perf        >Monitor  ┊1234567890123456
001:SUPERPAD  1.MIDI   ┊ ▬▄■    □
```

Select active performance in the leftmost field (named `>Perf`).

Set mode of monitor display. There are three alternatives:

1.MIDI
```
>Perf        >Monitor ┊1234567890123456
001:SUPERPAD  1.MIDI  ┊ ▬▄■    □
```

Displays MIDI channel information.

▬ ...	MIDI channel in use by the performance
■ ...	MIDI channel in use and playing
□ ...	MIDI note(s) at unused channel

2.Audio
```
>Perf        >Monitor ┊Audio channels
001:SUPERPAD  2.Audio ┊ ▪▪ ■▪▪▪ ▪■  ▪▪
```

Displays allocated audio channels.

▪ ...	Audio channel occupied and note is off
■ ...	Audio channel occupied and note is on

```
>Perf        >Monitor ┊12345678 Audio
001:SUPERPAD  2.Audio ┊ ▪▪ ■▪▪▪ ▪■  ▪▪
```

If any entry is set to use an individual output, the audio channels are split into two groups (as shown above); the first group displays the allocated <u>individual</u> audio outputs (ranging from 1 to 8) and the second group displays the rest of the allocated audio channels not using individual outputs. (Unfortunately, hardware limitations prohibit a more dynamic use of individual outputs.)

3.CPU
```
>Perf        >Monitor ┊CPU load
001:SUPERPAD  3.CPU   ┊■■■■■
```

Shows the load of the CPU (Central Processor Unit). When the meter is at max a <u>slight</u> performance degredation may occur.

Note: An exclamation point (!) appears to the right if the audio channel allocation becomes overloaded.

4.2   System Setup

```
>Set      |>Left >Right >Tune      >Dev
1.Master  | 100    100    440.0 Hz  any
```

These options define preferences for the entire system. Select option in the leftmost field. As usual, parameters related to the selected topic are shown to the right.

4.2.1   Master

```
>Set      |>Left >Right >Tune      >Dev
1.Master  | 100    100    440.0 Hz  any
```

Set master volume of left and right speakers at field >Left and >Right respectively. You can also set master tuning at field >Tune. >Dev is the device number used for sending and receiving SYSEX wave dumps (SDS).

4.2.2   X-Cntls (External Controllers)

```
>Set      |>XCtl1 >XCtl2 >Foot Sw
2.X-Cntls| 005     006    1.Normal
```

There are two definiable external controllers for modulations. The controller number for external controller 1 is set at >XCtl1 and external controller 2 is set at >XCtl2.

The rightmost field named >Foot Sw has two alternatives 1.Normal and 2.Inverse which specify the triggering mode of your foot pedal, if and only if it is connected to the foot switch input on the TX16W.

4.2.3   Slider (Data Slider)

The data slider (defaulted to controller number 006) can be used almost everywhere in the system for menu scrolling, value editing and much more.

```
>Set      |>Ch >Cntl >When
3.Slider  |any  006  1.Never (off)
```

Specify channel and controller number for your data slider (see above). >When defines when the controller is activated. There are three alternatives:

1.Never	Turns it off
2.Always	Data slider always active
3.In edit	Data slider is only active after pressing ENTER or when entering numbers.

4.2.4   Remote

```
>Set      |>Ch >+1 >-1 >L  >R >Ent >Alpha
4.Remote  |any 001 002 C#6 off off C#1-C5
```

There are some additional special facilities. You can define keys or controller numbers as aliases for buttons on the TX16W keypad. However, only the most common buttons are supported. Each field (except for >Ch and >Alpha) ranges over off $\underbrace{000\ 001\ 002\ldots127}_{Controllers}$ $\underbrace{C^{-1}\ C\#^{-1}\ D^{-1}\ldots C^{7}}_{Keys}$.

Sometimes it is hard to remember the MIDI controller number of a specific controller source, but if you press ENTER and touch any controller, Typhoon will automatically call up its number.

Field	Description
`>Ch`	MIDI channel receive
`>+1`	Increment (+1 on TX16W keypad)
`>-1`	Decrement (-1 on TX16W keypad)
`>L`	Key for "Move left" (◁ on TX16W keypad)
`>R`	Key for "Move right" (▷ on TX16W keypad)
`>Ent`	ENTER (on TX16W keypad)
`>Alpha`	The alphabet is mapped to a range of keys (as aliases for the alpha keys on the TX16W keypad)

Table 4.1: Remote keys

4.2.5   RS-422

```
>Set     >Mode      >Rate
6.RS-422 2.Master   1.19200
```

There is an RS-422 high speed port at the rear of your TX16W. All types of transmissions that can be done via MIDI (e.g. SDS) can also be done via the RS-422 (and vice versa). However, use at most one port at a time (i.e. MIDI or the RS-422).

Before a transmission can take place, one machine must be the master and the other the slave (it does not matter which is which).

(The maximum rate is 153600 baud. Higher rates cannot be provided due to hardware limitations, i.e. the speed of the CPU used in the TX16W.)

Transfer modes
1.Disabled
2.Master + transfer rate
3.Slave

Table 4.2: Transfer modes

Transfer rates
1.19200 baud
2.38400 baud
3.76800 baud
4.153600 baud

Table 4.3: Transfer rates

4.3   System Setup Utilities

The utility menu of system setup provides miscellaneous utilities for storage and memory. It is activated by pressing the UTILITY button after **system setup** has been entered. Two diodes are lit simultaneously indicating the chosen utility menu for system setup.

4.3.1   Load

```
>Util   :>Setup                  >Go
1.Load  :01:BACH
```

This utility loads the chosen setup (i.e. the entire condition of the machine including performances, voices and waves). Choose a setup at field >Setup. Note that loading a setup erases all items currently in memory.

```
Setup
>BACH >JARRE >MOZART >MYSETUP >SETUP >T→
```

As usual, it is also possible to obtain a directory of the setups on the current diskette by pressing ENTER at field >Setup.

```
Missing perf PERF (from TEMP)
         More [ent]  Skip [-1]  Stop [-]
```

A request such as the one shown above is displayed if performances, voices or waves are missing. If Typhoon can locate the diskette where the particular item may be stored, the name of the diskette is shown within parenthesis. In any case, the user is allowed to switch diskettes during this request. Press ENTER to step through the different items that are missing. Skip the requested item by pressing -1 . (Of course, skipping items results in an incorrect reconstruction and should only be done in an emergency, e.g. when the particular diskette, where the required item is stored, is lost or damaged.)

```
Incorrect version of wave ACIDKK
         More [ent]  Load [+1]  Stop [-]
```

If an incorrect version of the item is found, a query as shown above, will appear. You can choose to load this item instead of the actually requested one. Note that it is still possible to switch diskettes, and the query is automatically withdrawn if the correct item is found.

```
Keep loaded items?
                   Yes [+1]  No [-1]
```

Cancelling the operation (by pressing -) results in the query shown above. You can keep what has been loaded so far or undo the entire operation by pressing +1 and -1 respectively.

4.3.2   Save

```
>Util   :>Voice        >P/V/W      >Go
2.Save  :SETUPTST       3.All
```

This utility saves the entire condition of the machine as a file to diskette. Three different alternatives are provided at field >P/V/W (performances/voices/waves):

1.`None`   Results in saving the system settings and the dependencies to the required items (i.e. performances, voices and waves). The performances, voices and waves themselves are thus not saved.

2.`Unsaved`   Results in saving only items that are not currently available on other diskettes, i.e. the ones marked with "×".

3.`All`   Results in always saving all the performances, voices and waves in use. Items may get duplicated if they exist on other diskettes.

Queries

```
Insert next disk (14 items to save)
                          Cancel [-]
```

If Typhoon cannot save additional items to the current diskette due to lack of space, you are allowed to switch diskettes during this request. You can also cancel the entire procedure by pressing $\boxed{-}$.

```
Erase duplicate of voice MPC60
              Yes [+1]  No [-1]  Stop [-]
```

When the item is being resaved, Typhoon may discover that duplicates exist on other diskettes. If that is the case, a query as shown above appears. You can choose in deleting this duplicate by pressing $\boxed{+1}$, or keep it by pressing $\boxed{-1}$. Cancel the entire operation with $\boxed{-}$.

```
Erase last version of wave ACIDKK
              Yes [+1]  No [-1]  Stop [-]
```

If Typhoon finds the previous version of the item being resaved, a query as shown above appears. You can choose between erasing the previous version of the item or keeping it by pressing $\boxed{+1}$ and $\boxed{-1}$ respectively. Cancel the entire operation with $\boxed{-}$.

```
Replace identical perf DRUMS
              Yes [+1]  No [-1]  Stop [-]
```

When Typhoon discovers an identical version of the item being resaved, a query as shown above appears. If you choose to replace it by pressing $\boxed{+1}$, the older file gets erased. Pressing $\boxed{-1}$ results in creating another file. Cancel the entire operation with $\boxed{-}$.

4.3.3 Memory

```
>Util    ¦Main (Samples)  System Filter
3.Memory¦ 82%  1707008       92%   100%
```

The memory utility displays the amount of free main, system and filter memory. The actual waves/voices/performances are stored in main memory. References (e.g. the dependencies) to waves/voices/performances are stored in system memory. Different filter characteristics (in use by the filter tables) are stored in the filter memory.

The amount of free memory is shown in percent. The number of free sample points are also shown. (One sample point is a 12-bit value, and the number of "bytes" is obtained by multiplying the value with $\frac{12}{8} = 1.5$.)

4.3.4   Items

```
>Util   ┊Perfs Voices Waves >Delete  >Go
4.Items ┊   1      2     19 1.Unused
```

This utility shows the number of performances, voices and waves that are available in memory. There may exist items that are not currently used by any performance; you can erase them by using the option 1.Unused at field >Delete. Another option, to erase <u>all</u> the items from memory, is also provided as 2.All. Press ENTER at >Go to perform the actual operation.

4.3.5   Disk

```
>Util   ┊>Name      Free    >Rename >Format
5.Disk  ┊TYPHOON    124k
```

Finding the appropriate diskettes is made considerably easier if they are given names. You can do this by typing the name at field >Name and press ENTER at field >Rename (which will rename the diskette to the chosen name).

The number of free bytes on the diskette is shown at field Free (a "k" suffix means kilo-bytes).

By pressing ENTER at field >Format you can also format diskettes, i.e. initialize them in such a way that Typhoon can recognize them. (713k is available on a newly formatted diskette. Note that the TX16W uses double density format even if the diskette is of high density.)

4.3.6   Files

```
>Util   ┊>File       Kind    Size >Erase
6.Files ┊26:MULU     Wave    42k
```

This menu is used to manage files on the current diskette. A file usually corresponds to a stored item. You choose the file at field >File. If Typhoon recognizes the type of the file it is shown immediately to the right of its name. Other types of files are shown with the extension used in the MS-DOS file system (e.g. .SYS .T01 .XYZ).

```
File
>909CRASH >ACIDKK >ACIDSNR >AGOGHR16 >B→
```

And, as usual, press ENTER at >File to display the entire contents of the current diskette.

Press ENTER at field >Erase to erase the chosen file, but be careful; once the file is erased the data is entirely lost.

Using MS-DOS on a Personal Computer

Those who are familiar with the MS-DOS file system on a personal computer can copy/erase files whenever necessary. The names of the files are similar to the names presented in Typhoon. An extension is provided to specify the type of file. (See table 4.4 for the various extensions used in Typhoon.)

Type	Extension
Setup	.X##
Performances	.P##
Voices	.O##
Waves	.C##
Filter table	.T##
AIFF	.A##
Yamaha waves	.W##
System files	.SYS

Where ## is a number used to distinguish items with equal names.

Table 4.4: MS-DOS extensions

4.4   Performance Edit

```
>Perf          >Set     !># >Prm     !>Ch >Voice       >Vol
006:PERFTEST  1.Entries! 4 1.Voice  ! 15 042:PIANO2    100
```

Selection of performances is done in the leftmost field named `>Perf`. Each performance consists of three main settings; entries, program change codes and external triggering. Use field `>Set` to choose one of these topics.

4.4.1   Entries

Each performance is built upon a number of entries, where each entry has voice, output, transposition and priority settings. Choose entry number and desired parameter at field `>#` and `>Prm` respectively.

```
Performance entry      Del [-1] Copy [+1]
>MAXIPERC(10) >STRINGS(11) >PIANO(12)
```

Press ENTER at field `>#` to obtain a list containing both voice & MIDI channel information (as shown above). You can also copy and delete entries by pressing +1 and -1 respectively. Note that there is no method to generate a new and empty entry; the only way to create one is to duplicate an existing entry (with the **copy function**).

> **Note:** Hold down the menu button on the TX16W front panel (PERFORM EDIT in this case) and press a key on your master keyboard to perform "fast jumps" to the entries defined on that key and MIDI channel. Further information is available in chapter 3, section 3.10 (page 22).

Voice

```
>Perf          >Set     !># >Prm     !>Ch >Voice       >Vol
006:PERFTEST  1.Entries! 4 1.Voice  ! 15 042:PIANO2    100
```

In broad outline the entries of the performance are organized in the following manner:

Entry	MIDI channel	Voice	Volume
#1	10	PIANO	70
#2	10	STRINGS	30
#3	15	PERC.	90
#4	13	PIANO	90
⋮	⋮	⋮	⋮

Figure 4.1: Entries of the performance

Set MIDI channel, voice and volume for the chosen entry at field `>Ch`, `>Voice` and `>Vol` respectively.

> **Note:** This style of building performances supports both "layering" of several voices and multiple use of a specific voice on various channels.

```
>Perf         >Set     ¦># >Prm    ¦>Ch >Voice       >Vol
006:PERFTEST  1.Entries¦ 4 1.Voice ¦ 15 (BRASS)       100
```

If the voice has been changed due to MIDI program change codes, it is displayed within parentheses
(as shown above). However, as soon you try to edit it, the voice is immediately switched back to
its original value. Thus, received program change codes result in only temporary changes to the
performance. The same applies to MIDI volume changes.

Output

```
>Perf         >Set     ¦># >Prm     ¦>Out       >Pan
006:PERFTEST  1.Entries¦ 4 2.Output ¦5.Stereo ←100
```

Use this option to set the output in use by the chosen entry. Output settings are made in the
field named `>Out` (see table 4.5 for the settings available). If other output options than `1.Any` are
used, the voice is forced to the output given by the entry and the similar output setting in the
voice is overridden.

Field	Description
`1.Any`	Output is determined by the setting in voice (default).
`2.Left`	Output is sent to left speaker
`3.Right`	Output is sent to right speaker
`4.Mono`	Output is sent to both speakers in mono
`5.Stereo`	Output is sent to both speakers in stereo *
`6.Individ`	To specify the use of individual outputs

Table 4.5: Output settings in the performance

* Stereo mode provides you with a panning parameter (to adjust the balance between left
   and right speakers). However, the modulation of the panning parameter is determined
   by the **voice** and not by the **entry** in the **performance**.

Individual outputs

```
>Perf         >Set     ¦># >Prm     ¦>Out        >From >To
006:PERFTEST  1.Entries¦ 4 2.Output ¦6.Individ 2      8
```

There are eight individual outputs on the rear of the TX16W. The fields `>From` and `>To` denote
the inclusive range of outputs used. Additional individual output settings are done in the voices;
these are relatively assigned to the range you have specified here. For example, given the example
shown above, an offset range of $+2 \ldots +5$ will designate the individual outputs $4 \ldots 7$ (see Fig. 4.2).
Typhoon automatically switches to a special individual output mode once individual outputs are
used in an entry.

Trans (transposition)

```
>Perf         >Set     ¦># >Prm    ¦>O >S >Ct >Bot >Top
006:PERFTEST  1.Entries¦ 4 3.Trans ¦+1 +3 -33  C#3   C7
```

Use this option to transpose the voice in use by the chosen entry. The fields `>O` and `>S` denote
note shifting in octaves and semitones respectively, whereas `>Ct` (cent) is used for fine tuning.

There is a significant difference between **transposing** voices in performances and **pitch shift-
ing** the voices themselves. The former is a **note shift** (e.g. C^3 becomes C^4) whereas the latter
shifts the actual pitch of the wave(s).
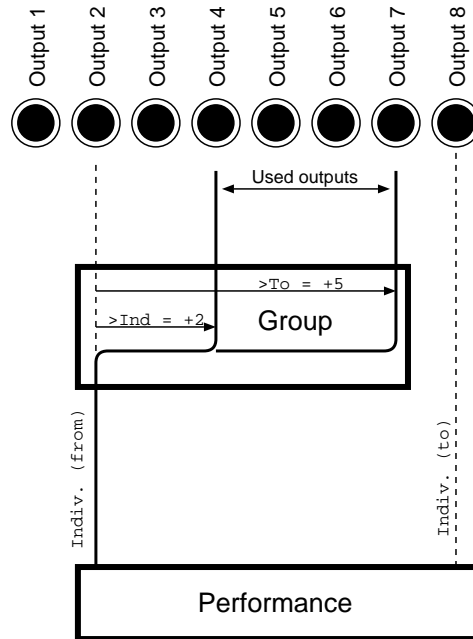
Figure 4.2: Individual outputs

The fields `>Bot` and `>Top` designate the bottom and top key respectively of the receive range. Only keys within this range will respond. This parameter can be used to combine various voices that act on the same MIDI channel (see Fig. 4.3).
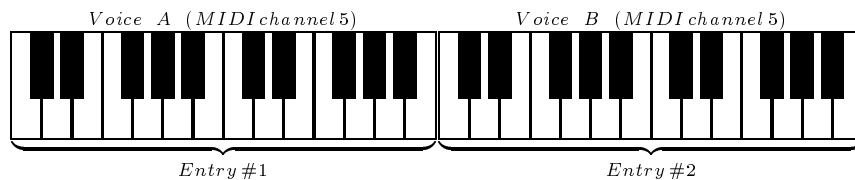
Figure 4.3: Using different voices on the same MIDI channel

Prio (Priorities)

Use this option to set/display the priority in use by the chosen entry.

```
>Perf          >Set      >#  >Prm      >Priority
006:PERFTEST   1.Entries  4  4.Prio   3.High
```

Since only 16 audio channels can be played simultaneously, conflicts may occur. Use the priority parameters to suppress other entries if conflicts arise. Entries with higher priorities suppress entries with lower priorities. There are three priorities available: `1.Low`, `2.Mid` and `3.High`.

4.4.2 Pgm chg (Program Change)

```
>Perf          >Set     |>PCH >Voice
006:PERFTEST  2.Pgm chg! 042 007:BRASS
```

Use this option to set program change codes in use by the entire performance. If a program change code is received on MIDI channel #x, the voice for channel #x is replaced by the voice specified in the program change code table.

Refer to Fig. 4.4. The performance **before** receives program change code 42 at MIDI channel 10, which results in the new status as described by **after**. However, these are only temporary changes; you can "reset" the performance by pressing the PERFORM EDIT menu button twice.

Entry	Voice	MIDI channel		Entry	Voice	MIDI channel
#1	PIANO	10		#1	BRASS	10
#2	STRINGS	10	⇒	#2	BRASS	10
#3	PERC.	15		#3	PERC.	15
#4	PIANO	13		#4	PIANO	13
#5	FAIRLIGH	11		#5	FAIRLIGH	11
before				**after**		

Figure 4.4: The effect of using program change codes in performances

4.4.3 Ext trg (External Triggering)

```
>Perf          >Set     |>Thres >Ch >Key
006:PERFTEST  3.Ext trg! 55%     1    C2
```

Use this option to set the parameters for the external trigger (on the front panel of the TX16W). If the trigger input signal exceeds the specified threshold defined at field **>Thres**, the key **>Key** is triggered on MIDI channel **>Ch**. The key is released when the signal no longer exceeds the threshold. Set key to **none** (by pressing ⎯ at field **>Key**) to disable external triggering.

4.5　Performance Edit Utilities

Performance edit utilities are utilities for performances only. The menu is activated by pressing the
[UTILITY] button after entering **performance edit**. Two diodes are lit simultaneously indicating
the chosen utility menu for performances.

4.5.1　Load

```
>Util   ┊>Perf               >Test >Go
1.Load  ┊01:MYPERF
```

The load utility loads the chosen performance from the current diskette. The voices and the waves
required by the performance are automatically loaded; missing voices/waves are requested. See
section 4.3.1 (page 28) for further information.

4.5.2　Save

```
>Util   ┊>Perf          >V/W         >Go
2.Save  ┊001:MYPERF      2.Unsaved
```

Press [ENTER] at >Go to save the chosen performance (in memory) as a file to diskette. See
section 4.3.2 (page 28) for further information.

4.5.3　Delete

```
>Util     ┊>Perf                       >Go
3.Delete  ┊001:PERF
```

This utility deletes performances from memory. (Erasing files from diskettes is possible in the
utilities of system setup, see section 4.3.6, page 30.)

　　Press [ENTER] at >Go to remove the chosen performance. Note that the voices/waves in use by
the performance are not removed, since other performances may share them.

4.5.4　Rename

```
>Util     ┊>Perf         >Name         >Go
4.Rename  ┊001:MYPERF      ANTHEM
```

This utility renames the chosen performance. Press [ENTER] at field >Name to specify the name.
(Move the cursor out of the field range to exit.) Press [ENTER] at >Go to perform the actual
operation.

4.5.5　Copy

```
>Util    ┊>Perf         >Name         >Go
5.Copy   ┊001:ORGAN       ORGAN1
```

This utility makes a duplicate of the chosen performance and gives it the name specified at field
>Name. Since it is preferable that duplicates have slightly different names, Typhoon will choose a
name for you. If you wish to give the duplicate a name other than the one chosen by Typhoon,
you can do so by pressing [ENTER] at >Name. Press [ENTER] at >Go to perform the actual operation.

4.5.6 Swap

```
>Util    |>Perf        >With       >Go
6.Swap   |001:MYPERF   002:TEST
```

This utility exchanges the two chosen performances. This function is more useful for voices and waves, since these types of items may be shared by other items. Because performances are not shared by other items, the effect of the function is merely a way of reorganizing the list of performances.

4.5.7 New

```
>Util    |>Name                    >Go
7.New    | TEST
```

This option creates a new performance with the name specified at field `>Name` containing a single entry.

4.6   Voice Edit

```
>Voice          >Grp >Param    ┊>Bot >Top >Min >Max
001:PIANO        01   1.Range  ┊ C2   C7     0  127
```

The field >Voice specifies the current voice with voice parameters shown to the right. As described
in chapter 1, section 1.3 (page 6) waves are used as "raw material" upon which **groups** are built.
A collection of groups is called a **voice**; thus the parameters considered here affect both groups
and voices.

```
Voice                       Copy [+1]
>MAXIPERC >STRYNG >PIANO >EFFECTS >ORCHE
```

To view a list of voices, press ENTER (as usual) at the field named >Voice. It is also possible to
make duplicates of a voice by pressing +1 (on your TX16W keypad) while the list is displayed
(see the illustration shown above).

There are many editable parameters for a group. See the separate sections for each parameter
for further information.

```
>Voice          >Grp >Param    ┊>Bot >Top >Min >Max
001:PIANO        01   1.Range  ┊ C2   C7     0  127
```

The current group number is displayed at the field named >Grp.

```
Voice                  Del [-1] Copy [+1]
>C3 >D3 >E3 >F3 >F#3 >G3_A3 >C4_B4 >C5
```

(Press ENTER at field >Grp to view the list of groups.)

As usual, you can press ENTER to view the list of groups of the current voice. Duplication and
deletion of a group is possible by pressing +1 and -1 respectively.

Note that there is no method to create new groups; creating a new group is done by duplicating
another. There will always be at least one group available, since it is not possible to delete the
"last" one.

Normally a group that has an ordinary range, e.g $C^3 \ldots C^4$ is displayed as C3_C4, but ranges
that consist of single keys are displayed with that key only, e.g. the range $C^3 \ldots C^3$ is displayed
as C3.

Note: Hold down the menu button on the TX16W front panel (VOICE EDIT in this case) and
press a key on your master keyboard to perform "fast jumps" to the group(s) defined
on that key. Further information is available in chapter 3, section 3.10 (page 22).

There are 13 parameters for each group. See the separate sections for each parameter for further
information.

4.6.1   Range

```
>Voice          >Grp >Param    ┊>Bot >Top >Min >Max
001:DRUMS        01   1.Range  ┊ C3   B3    30  100
```

This parameter specifies the active range of the group. The bottom key and top key inclusive
specify the active key range (see fig 4.5). The group will only respond to keys that appear within
this range. Changing the bottom key <u>moves</u> the range, whereas changing the top key <u>resizes</u> the
range. For example, changing the range $C^3 \ldots B^3$ by changing the bottom key C^3 to C^2 <u>moves</u>
the range to $C^2 \ldots B^2$.

Range $C^3...B^3$
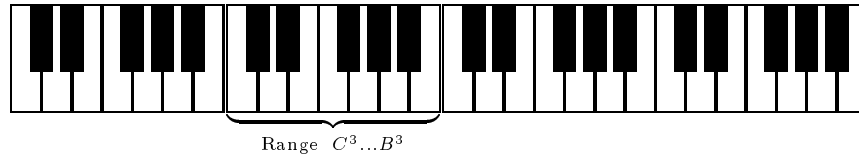
Figure 4.5: The key range

Similarly, `>Min` and `>Max` define the velocity range (see Fig. 4.6) such that the group only responds to velocities within this range.

127

0

Velocity
range $30 \ldots 100$
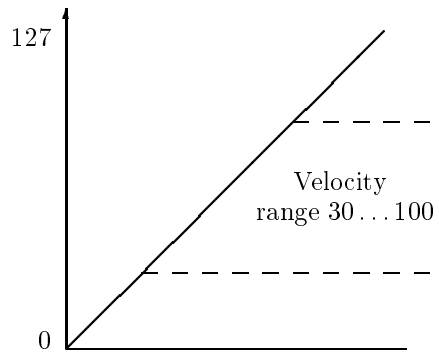
Figure 4.6: Velocity range

4.6.2 Waves

```
>Voice        >Grp >Param    >#  >Wave       >Bot
001:DRUMS      01    2.Waves   2  042:SNARE    D3
```

This parameter specifies the wave(s) in use by the current group. If you are using only one wave, you can specify the wave in the field named `>Wave`. **Split point** parameters can be used for multi-sampled instruments such as pianos. The fields used in this case are `>#` (split point number) and `>Bot` (the bottom key of a split).

To review the sound architecture, a multi-sampled instrument must be split into several consecutive ranges, where each split is bound to a wave (see chapter 1, section 1.3.2, page 8 for further information).

Since the ranges are consecutive, the top key of one split is immediately followed by the bottom key of the next. Thus, instead of specifying the actual ranges, e.g. $C^1 \ldots B^1$, $C^2 \ldots B^2$ and $C^3 \ldots B^3$, it is easier (and much more practical) to just designate the **split points**, i.e. the keys where the splits are separated. The most logical way to do this is to let the bottom key of a split specify the split point. Thus, the first split does not have a split point at all.

Consider Fig. 4.7, note that the first and the last splits are "infinite," but it does not matter since the group is limited by the key range specified in option `1.Range`.
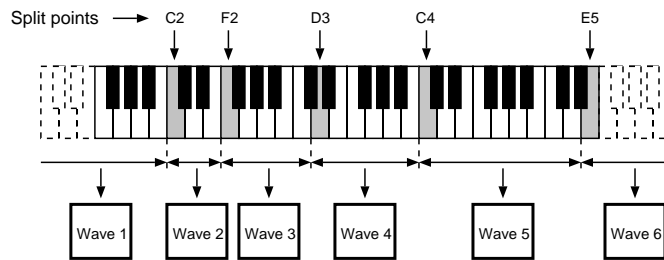
Figure 4.7: Designating splits by using split points

```
>Voice         >Grp >Param    >#  >Wave        >Bot
001:DRUMS       01   2.Waves   2  042:SNARE    D3
```

⇓

(Press ENTER at field ># to view the list of split points.)

⇓

```
Splitpoint              Del [-1] Copy [+1]
>1st >D3 >E3 >F3 >F#3 >G3 >C4 >B4
```

As usual, you can press ENTER to view the list of split points in use by the current group. You can copy and delete split points by pressing +1 and -1 respectively. Copying split points results in underlining new ones to the right of the cursor. The field >1st is not itself a physical split point, denoting instead the beginning of the list.

It is not possible to move a split point out of its current range. If we were to move the ranges "$\ldots B^2$," "$C^3 \ldots B^3$," "$C^4 \ldots B^4$," and "$C^5 \ldots$" one octave higher, we have to move the rightmost range first and then continue with the preceding ranges. In this case, we move the range "$C^5 \ldots$" to "$C^6 \ldots$," then "$C^4 \ldots B^4$" to "$C^5 \ldots B^5$", then "$C^3 \ldots B^3$," and at last "$\ldots B^2$" to "$\ldots B^3$" (see Fig. 4.8).
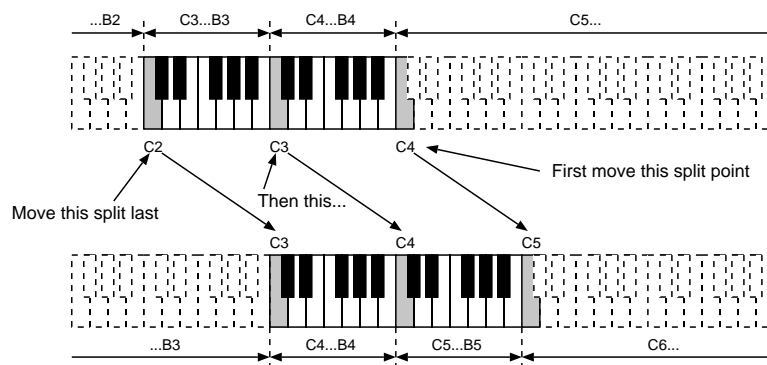
Figure 4.8: Moving split points

Note: The split points are not affected if the range of the group is changed.

4.6.3 Pitch

```
>Voice        >Grp >Param   >O >S >Ct >Key scaling
001:PIANO      01   3.Pitch  +1 -1 +42 3.inverse
```

This parameter enables you to pitch shift the waves in use by the group. The relative pitch is denoted in octaves `>O`, semitones `>S` and cents `>Ct`. It is also possible to change the key scaling.

> **Note:** This option pitch shifts the actual wave(s) in use by this group and does <u>not</u> "move" the physical range. You can "move" the range by <u>transposing</u> the voice in **performance edit**.

Key scaling

Typhoon also provides various key scalings. A different key scaling means that the keys are bound to other pitches. For example, the inverse key scaling "flips" the keyboard so that ascending keys become descending. A fixed key scaling means that all the keys are "the same" (see table 4.6 for the various key scalings available).

Key scaling	Description
1.inv *4	Inverse key scaling
	where semitones are multiplied by 4 in pitch
2.inv *2	Inverse key scaling
	where semitones are doubled in pitch
3.inverse	Inverse key scaling
4.inv 1/2	Inverse key scaling
	where semitones are halved in pitch
5.inv 1/4	Inverse key scaling
	where semitones are divided by 4 in pitch
6.fixed	Fixed key scaling;
	all keys are given the same pitch
7.1/4	Normal key scaling
	where semitones are divided by 4 in pitch
8.1/2	Normal key scaling
	where semitones are halved in pitch
9.normal	Normal key scaling (default)
10.*2	Normal key scaling
	where semitones are doubled in pitch
11.*4	Normal key scaling
	where semitones are multiplied by 4 in pitch

Table 4.6: Available key scalings

> **Note:** Pitchless groups for percussion, such as snare drums, should normally use the fixed key scaling.

4.6.4 Volume

```
>Voice        >Grp >Param   >Vol >Vel >Max
001:DRUMS      01   4.Volume  100 100%  60
```

This parameter specifies the volume and the velocity sensitivity of the group. The volume is set in the field named `>Vol` and denotes the volume for maximum velocity; velocity sensitivity (measured in percent) is set in the field named `>Vel` (zero percent implies no velocity sensitivity at all). The absolute values for the velocity range from 0 to 127. Since it is almost impossible to strike as hard

as 127 (depending on your type of keyboard) it is often convenient to set maximum velocity to a much lower value. (see Fig. 4.9). It is also possible to achieve inverse velocity by using negative values on >Vel and naturally the >Max becomes >Min.
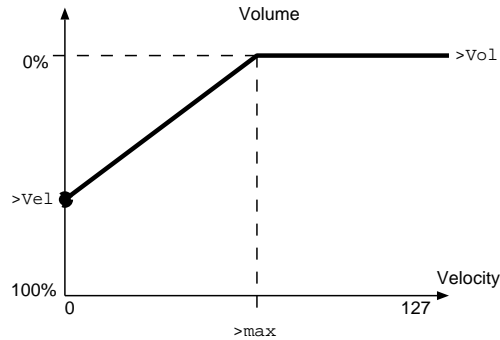
Figure 4.9: Velocity sensitivity

4.6.5   Filter

```
>Voice        >Grp >Param     >FTBL       >D-Axis >Dyn >Fix
001:DRUMS      01    5.Filter  12:PEAK     1.freq   99   50
```

This parameter specifies the type of filter in use by the current group. The type of filter (i.e. the filter table to be used) is set in the field named >FTBL.

The characteristics for each type of filter are described by a matrix where the two axes denote two characteristics (see Fig. 4.10). Q-filters (e.g. low pass and high pass filters) are typically described by their level and frequency, but there are filter types with other characteristics as well (e.g. **slope** and **frequency**).
Only one of the axes is allowed to be "dynamic," i.e. possible to modulate (see chapter 1, section 1.3.5, page 9 for further information on modulations). The choice of dynamic axis is set in the field named >D-Axis. As mentioned above, what types of axes there are depend on the chosen filter table.

The choice of >Dyn and >Fix determine the origin of the filter in use, where the former denotes the origin of the dynamic axis and the latter denotes the origin of the static (fixed) axis. Only values in steps of 10 are allowed on the static (fixed) axis.

4.6.6   Output

```
>Voice        >Grp >Param     >Output     >Ind >To
001:DRUMS      01    6.Output  4.Mono       +2   +5
```

This parameter specifies the output in use by the group. There are five alternatives shown in table 4.8. Note that the output setting specified here can be overridden by the output setting in **performance edit**.

```
>Voice        >Grp >Param     >Output   >Pan >Ind >To
001:DRUMS      01    6.Output  5.Stereo  ←42   +2   +5
```

The last option 5.Stereo is provided with a panning parameter (as shown above) to change the balance between left and right speakers. The balance ranges from ←50 to →50.
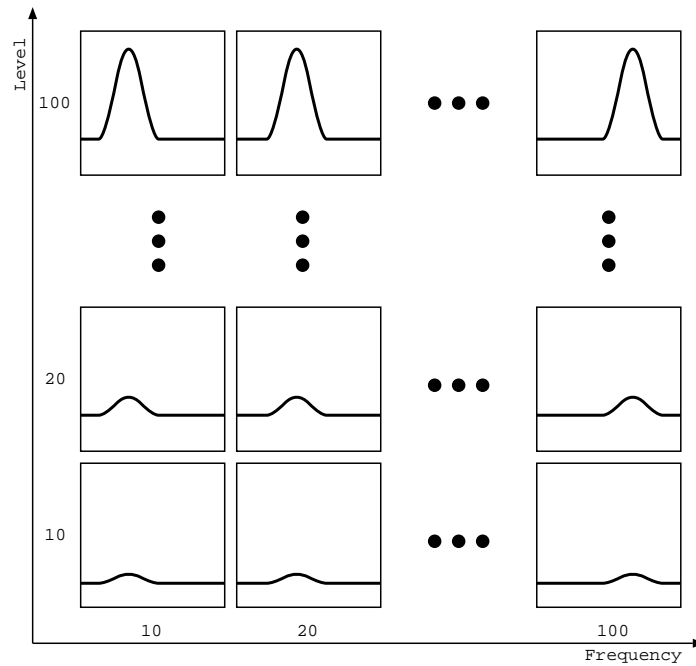
Figure 4.10: The filter table

Filter	Axes	Full name
1.Q_LPF	freq, level	Low pass Q-filter
2.Q_HPF	freq, level	High pass Q-filter
3.WIDE_BPF	freq, level	Wide band pass filter
4.NRRW_BPF	freq, level	Narrow band pass filter
5.LOW_LPF	freq, level	Low low pass filter
6.HIGH_LPF	freq, level	High low pass filter
7.LOW_HPF	freq, level	Low high pass filter
8.HIGH_HPF	freq, level	High high pass filter
9.HPF_LPF	freq, level	High to low pass filter
10.BPF_BEF	freq, level	Band pass to eliminate
11.DIP	freq, level	DIP (notch) filter
12.PEAK	freq, level	Peak filter
13.LOSL_LPF	freq, slope	Low low pass filter with slope
14.HISL_LPF	freq, slope	High low pass filter with slope
15.LOSL_HPF	freq, slope	Low high pass filter with slope
16.HISL_HPF	freq, slope	High high pass filter with slope

Table 4.7: Available filter tables

Output	Description
1.None	The group becomes silent
2.Left	For left speaker
3.Right	For right speaker
4.Mono	For both speakers (mono)
5.Stereo	For both speakers (stereo)

Table 4.8: Output settings in the voice

Note: Stereo **groups** will occupy <u>two</u> audio channels during their play, and stereo **waves** will only be played in stereo if the stereo option is chosen. It will also do if the output setting of the voice is surpressed by a stereo setting in **performance edit**.

The fields `>Ind` and `>To` are used for individual outputs and are only of interest if the corresponding option in **performance edit** is used. Outputs are then relatively assigned to the outputs specified in **performance edit**, see fig. 4.2 (page 34).

4.6.7   AEG (Amplitude Envelope Generator)

```
>Voice        >Grp >Param    ┊>At >D1 >L1 >D2 >L2 >Rl
001:PIANO       01   7.AEG    ┊  5   5  50   5  35  10
```

The AEG describes the volume distributed over time. This is a slightly more advanced version of the common ADSR and is best shown by Fig. 4.11.
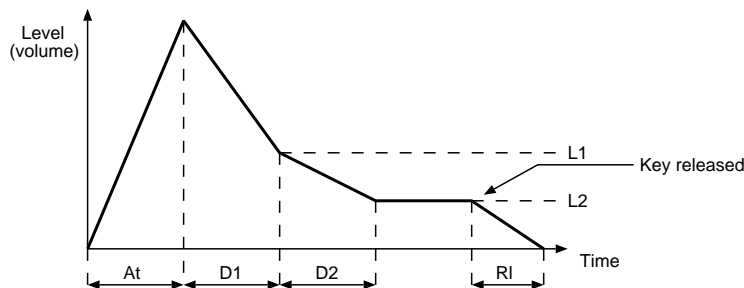
Figure 4.11: The AEG (Amplitude Envelope Generator)

4.6.8   Mode

```
>Voice        >Grp >Param    ┊>Poly >Mode
001:DRUMS       01   8.Mode   ┊ on    2.One-shot
```

This parameter specifies the mode of the current group. Set the value in the field named `>Poly` to `off` to disable the polyphony, i.e. at most <u>one</u> and <u>the same</u> audio channel is used each time the group is played.

`>Mode` specifies the playing mode of the current group. There are a total of four modes:

1.Normal

2.Oneshot — Results in never releasing key (as described by the **AEG**). Useful for percussion.

3.Glide — Portamento

4.Release — Triggering on release of keys.

```
>Voice        >Grp >Param    │>Poly >Mode    >Glide
001:DRUMS      01   8.Mode   │ on   3.Glide  9999ms
```

Typhoon provides monophonic portamento, or glide. With glide mode enabled, if you press a key while holding down another, the pitch will glide between the two keys. The total time of the glide is specified in field `>Glide`. The time is expressed in milliseconds (1000 milliseconds = 1 second).

4.6.9 Mod Tbl (Modulation Table)

Entry	Source	Destination	Amount
#1	1.Veloc	5.Attack	+7
#2	3.Key	4.Pan	+50
#3	5.Wheel	6.Glide	-500
⋮	⋮	⋮	⋮
#8	6.PBend	1.Pitch	>Sm=17, >Ct=22

Figure 4.12: A modulation table

There are eight available modulation entries in the modulation table. Each entry describes a modulation, i.e. how a chosen parameter (modulation target) is to be varied by a modulation source.

```
>Voice        >Grp >Param     │># >Source  >Dest      >Amt   >Frz
001:STRINGS    01   9.Mod tbl │ 3  5.Wheel  6.Glide    -500    off
```

The **modulation entry number** is chosen in the field named `>#`, and the **amount**, expressing the <u>maximum</u> modulation of the chosen target, is set in the field named `>Amt`. Some modulations are also equipped with a `>Frz` (frozen) parameter, such that momentary modulator values on key down can be taken from the modulation source. Naturally, some modulations are "timeless" (or "frozen") by their nature (e.g. the velocities given by the keyboard) and the `>Frz` field is omitted.

Using Velocity as a Modulation Source

There are two methods of using velocity as a modulation source; keyboard based and range based. The keyboard based velocity uses the total velocity range given by the keyboard, i.e. from 0 to 127. Zero velocity produces no modulation and maximum velocity (127) produces maximum modulation as described by figure 4.14.

Range based velocity modulation operates on the <u>local</u> range given by the `>Min` and `>Max` values of the group (see fig. 4.15).
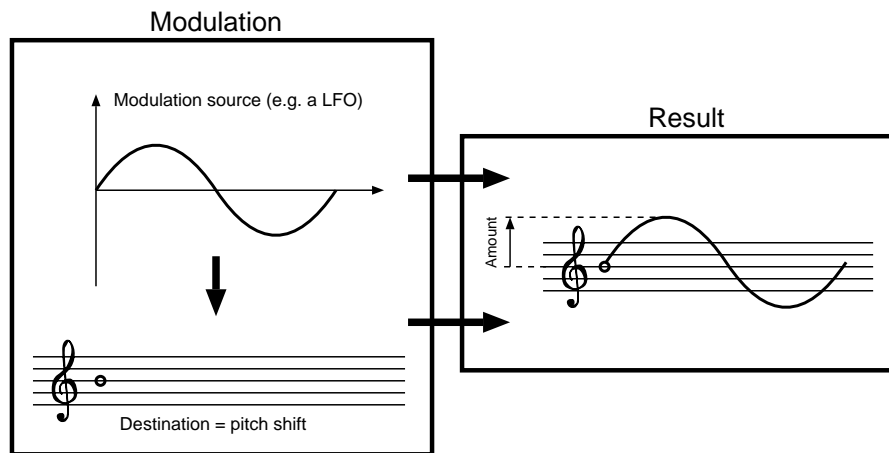
Figure 4.13: Illustrating modulation
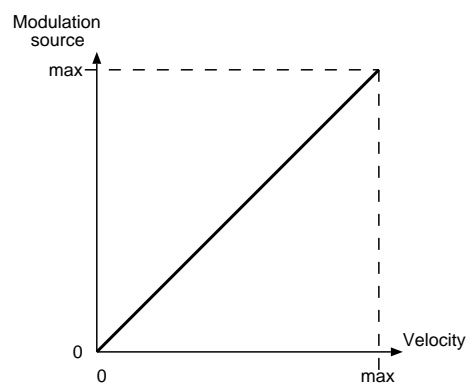
Figure 4.14: Using keyboard based velocity as modulation source
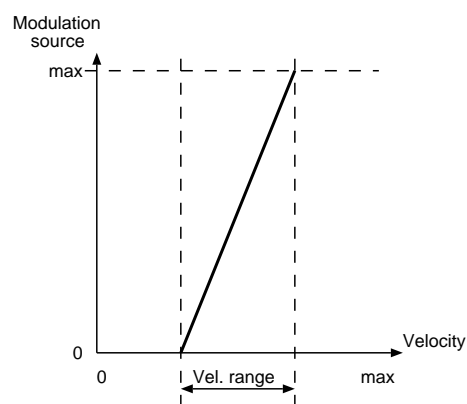
Figure 4.15: Using range based velocity as modulation source

Available modulation sources	
Source	**Description**
`1.Vel`	Velocity given by keys over the total velocity range (i.e. $0 \ldots 127$). Zero velocity produces no modulation and maximum velocity (127) produces maximum modulation.
`2.Vel/R`	Velocity/range. Velocity is taken from the <u>local</u> key range (of the group). Minimum velocity (defined by `>Min`) produces zero modulation and maximum velocity (defined by `>Max`) produces maximum modulation.
`3.Key`	The middle key of the keyboard produces no modulation, the right hand side produces positive modulation and the left hand side produces negative modulation.
`4.Key/R`	Key/range. The middle key of the <u>local</u> key range (the range defined by `>Bot` and `>Top` of the group) produces no modulation. The right hand side of the local key range produces positive modulation, whereas the left hand side produces negative modulation.
`5.Wheel`	Standard modulation wheel. Modulation ranging from no modulation to maximum modulation.
`6.PBend`	Pitch bend wheel. Produces modulation ranging from maximum <u>inverse</u> modulation to maximum modulation.
`7.PB/H`	Pitch bend for held keys. Works like `6.PBend` but it is only effective on held keys.
`8.XCtl1`	External controller #1 - defined in **system setup**. Produces modulation ranging from no modulation to maximum modulation.
`9.XCtl2`	External controller #2 - defined in **system setup**.
`10.Press`	Aftertouch. Produces modulation ranging from no modulation to maximum modulation. (Polyphonic aftertouch is supported.)
`11.Extern`	The external input on the front panel of the TX16W. Produces modulation ranging from no modulation to maximum modulation.
`12.LFO1`	Low Frequency Oscillator #1. Produces modulation ranging from maximum <u>inverse</u> modulation to maximum modulation.
`13.LFO2`	Low Frequency Oscillator #2.
`14.ENV1`	Envelope #1. Produces modulation ranging from maximum <u>inverse</u> modulation to maximum modulation.
`15.ENV2`	Envelope #2.

Table 4.9: Available modulation sources

Using the Keyboard as a Modulation Source

As in the case of velocity, there are also two ways you can use the keyboard as a modulation source. With the keyboard based method, the middle key of the entire keyboard produces no modulation; the right hand side produces positive modulation and the left hand side produces negative modulation (see Fig. 4.16).

The range based method operates in a similar fashion on the <u>local</u> range given by the `>Bot` and `>Top` values of the group (see fig. 4.17).
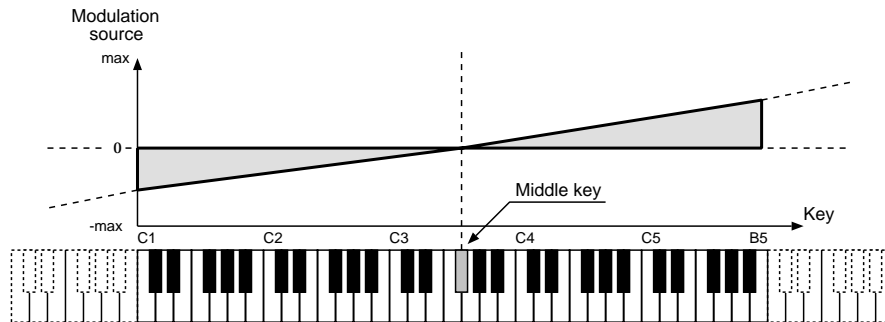
Figure 4.16: Using keyboard based key modulation
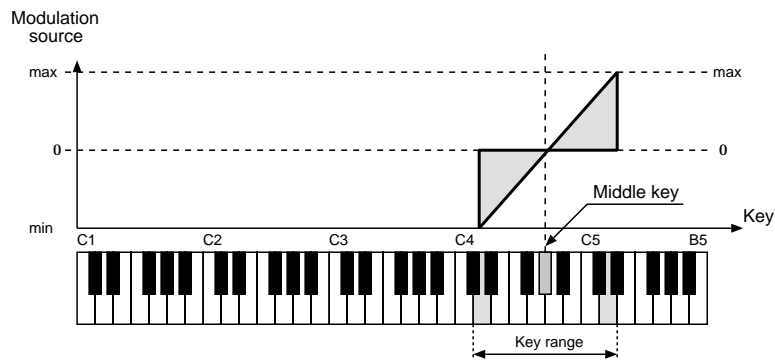
Figure 4.17: Using range based key modulation

4.6.10   LFO1 (Low Frequency Oscillator)

```
>Voice        >Grp >Param    >Shape   >Rate >Amp >Sync   >Pos
001:STRINGS    01  10.LFO1    1.Triang 1000   100 2.Reset 99
```

The field named `>Shape` provides five different shapes (see fig. 4.18).

Additional parameters are: `>Rate` to specify the rate of the oscillator (any value between 1 and 1000) and `>Amp` to specify the amplitude of the oscillator (any value between 0 and 100).

Since several oscillators may run in parallel, different synchronization options are provided. The type of synchronization is set in the field named `>Sync`. There are four alternatives:

Available modulation destinations	
Destination	**Description**
`1.Pitch`	Modulates the pitch of the **group**. The maximum amount of modulation is set by the parameters `>Sm` (semitones) and `>Ct` (cents).
`2.Volume`	Modulates the volume of the **group**. The maximum amount `>Amt` of modulation is set to any value between -100 and +100.
`3.Filter`	Modulates the dynamic axis in use by the filter of the group. Set the maximum amount `>Amt` of modulation to any value between -100 and +100.
`4.Pan`	Stereo panning. Set the maximum amount `>Amt` of modulation to any value between -100 and +100. This option is effective only if the group is in stereo mode (check `6.Output`).
`5.Attack`	Modulates the **attack** parameter of the AEG. Set the maximum amount `>Amt` of modulation to any value between -100 and +100.
`6.AEG/T`	Modulates the time of the AEG. Set the maximum amount `>Amt` of modulation to any value between -200 and +200.
`7.Glide`	Modulates the speed of portamento. Set the maximum amount `>Amt` of modulation to any value between -9999 and +9999.
`8.LFO1/A`	Modulates the amplitude parameter of LFO #1 (of the group). Set the maximum amount `>Amt` of modulation to any value between -100 and +100.
`9.LFO2/A`	Ditto for LFO #2.
`10.LFO1/R`	Modulates the rate (or frequency) parameter of LFO #1. Set the maximum amount `>Amt` of modulation to any value between -1000 and +1000.
`11.LFO2/R`	Ditto for LFO #2.
`12.ENV1`	Modulates the amplitude parameter of envelope #1. Set the maximum amount `>Amt` of modulation to any value between -100 and +100.
`13.ENV2`	Ditto for envelope #2.

Table 4.10: Available modulation destinations
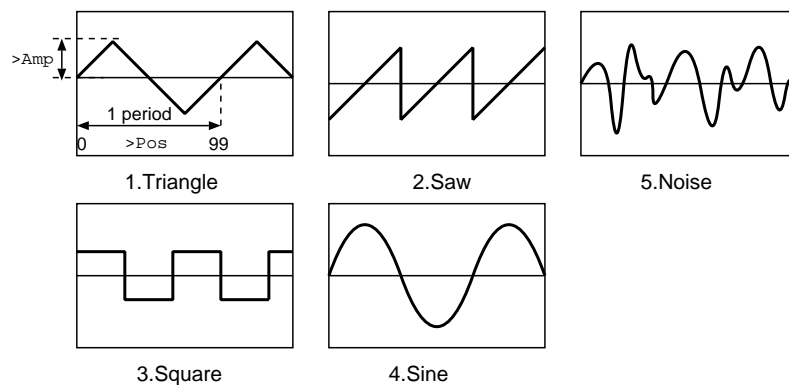
Figure 4.18: Available LFO shapes

1.`None`	Synchronization disabled.
2.`Reset`	The phase of the LFO is reset to the position specified in the field named `>Pos` when the group starts playing.
3.`Group`	Phase synchronization is performed on note-on within the group.
4.`Voice`	Synchronization is performed within the voice.

Note: To obtain complete synchronization, the LFOs <u>must</u> have the same rates.

4.6.11   LFO2 (Low Frequency Oscillator)

See LFO1 (option no. 10)

4.6.12   ENV1 (Envelope #1)

```
>Voice        >Grp >Param    | >L0 >T1   >L1 >T2   >L2 >T3   >L3 >Amp
001:STRINGS    01   12.ENV1  |+100 100 -100 100 -100 100 -100  100
```

`>L0` is the initial level of the envelope (any value between -100 and +100). `>L1`, `>L2` and `>L3` are the envelope levels in percent of `>Amp` after time `>T1`, `>T1+>T2` and `>T1+>T2+>T3` has expired respectively. `>L3` defines the final envelope level and `>Amp` is the actual amplitude of the complete envelope (see Fig. 4.19).
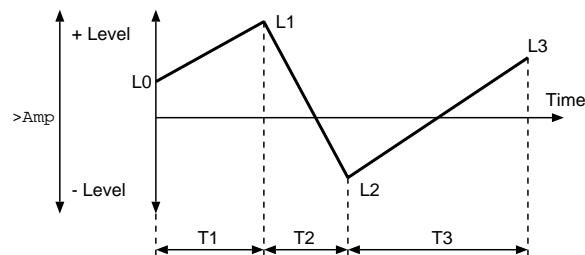
Figure 4.19: The envelope

4.6.13   ENV2 (Envelope #2)

See ENV1 (option no. 12)

4.7   Voice Edit Utilities

Voice edit utilities are utilities for voices only. The menu is activated by pressing the UTILITY button after entering **voice edit**. Two diodes are lit simultaneously indicating the chosen utility menu for voices.

4.7.1   Load

```
>Util   >Voice              >Test >Go
1.Load  01:PERCUSS
```

The load utility loads the chosen voice from the current diskette. The waves required by the voice are automatically loaded; missing waves are requested.

```
Loaded voice TR-909 (requires 112632)
                Keep [+1]  Unload [-1]
```

Pressing ENTER at field >Test also results in loading the wave, but with the opportunity to undo the operation. This is especially useful to test certain sounds and keep them only if you are satisfied. Press +1 to keep the loaded voice, and -1 to undo the operation. Pressing ENTER at >Go results in loading the chosen wave without this dialog. See section 4.3.1 (page 28) for further information.

4.7.2   Save

```
>Util   >Voice        >Waves       >Go
2.Save  001:PERC      2.Unsaved
```

Press ENTER at >Go to save the chosen voice (in memory) as a file to diskette. See section 4.3.2 (page 28) for further information.

4.7.3   Delete

```
>Util    >Voice               >Go
3.Delete 001:PERC
```

This utility deletes voices from memory. (Erasing files from diskettes is possible in the utilites of system setup, see section 4.3.6, page 30.) Press ENTER at >Go to remove the chosen voice. Note that the waves in use by the voice are not removed, since other voices may share them.

4.7.4   Rename

```
>Util    >Voice        >Name        >Go
4.Rename 001:CHURCH      ORGAN
```

This utility renames the chosen voice. Press ENTER at field >Name to specify the name. (Move the cursor out of the field range to exit.) Press ENTER at >Go to perform the actual operation.

4.7.5   Copy

```
>Util    >Voice        >Name         >Go
5.Copy   001:ORGAN       ORGAN1
```

This utility makes a duplicate of the chosen voice and gives it the name specified at field `>Name`. Since it is preferable that duplicates have slightly different names, Typhoon will choose a name for you. If you wish to give the duplicate a name other than that chosen by Typhoon, you can do so by pressing $\boxed{\text{ENTER}}$ at `>Name`. (Move the cursor out of the field range to exit.)

Press $\boxed{\text{ENTER}}$ at `>Go` to perform the actual operation.

4.7.6   Swap

```
>Util    >Voice        >With         >Go
6.Swap   001:ORGAN     007:CHOIR
```

This utility exchanges the two chosen voices. At first glance this seems to be a totally useless function, but it has been shown to be quite the contrary. Consider a situation where one voice should be replaced by another. It is quite an effort to replace all the occurrences of the voice manually. However, using this utility you do the operation in a single step, and more important, it is equally simple to swap the same items back again if you are not satisfied with the replacement.

4.7.7   New

```
>Util    >Name                       >Go
7.New     TEST
```

This option creates a new voice with the name specified at field `>Name`. The new voice will contain a single group with default parameter settings.

4.8   Wave Edit

```
>Wave          >Func    :>Start >End    >Auto >Go
001:MAXIKICK  1.Trim    :  1024    9327
```

The field `>Wave` designates the current wave whose parameters are shown to the right. There are several types of functions that can be performed on a wave such as trimming, looping and crossfading. Some functions are provided with a field `>Auto` to let Typhoon perform the function (based on some intelligence) on the selected wave. Also, most of the functions allow you to listen to the result before deciding whether to keep the changes or not.

```
Voice                      Copy [+1]
>MAXIKICK >ACIDKK >KICK >SNARE >SNARE2
```

As usual, pressing ENTER at field `>Wave` shows the list of waves that are available in memory. You can also duplicate waves by pressing +1 .

4.8.1   Trim

```
>Wave          >Func    :>Start >End    >Auto >Go
001:MAXIKICK  1.Trim    :  1024    9327
```

Use this function to cut out the range specified with `>Start` and `>End`. When you press ENTER at `>Go` everything that lies outside this range is deleted (see Fig. 4.20). `>Auto` will automatically remove silent parts in the beginning and the end of the selection.

You can also select a range in real time by using the - button on the front panel of your TX16W panel: Place the cursor on `>Start` (or `>End`); play the wave (e.g. by pressing a key on your master keyboard) and press and hold - to set the start and release the button to set the end.
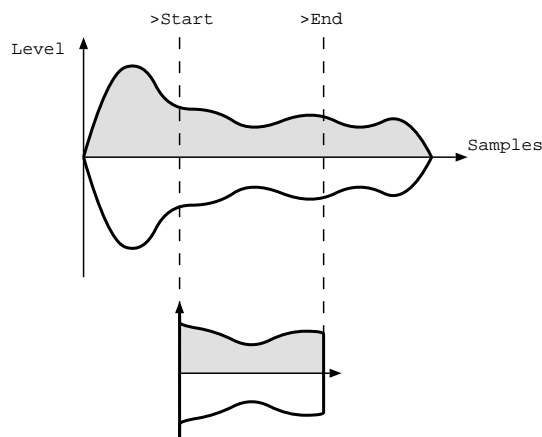
Figure 4.20: Trimming the wave

4.8.2 Loop

```
>Wave          >Func    ┊>Loop
001:MAXIKICK  2.Loop    ┊ off
```

Loops repeat a specific range at the end of the wave (see Fig. 4.21). Turn loop mode `on/off` by pressing `-` on the front keypad at field `>Loop`. Once the loop mode is activated the function is extended with two additional parameters:

```
>Wave          >Func    ┊>Loop  >To     >Auto >Go
001:MAXIKICK  2.Loop    ┊  741   9327
```

The repeat point of the loop is set at the field `>Loop`. You can change the loop manually by simply entering other values at `>Loop` and `>To`; entering new values at field `>To` moves the loop. Once you press `ENTER` at `>Go` the loop is set.

Warning: Any sound beyond the end of the new loop is lost!
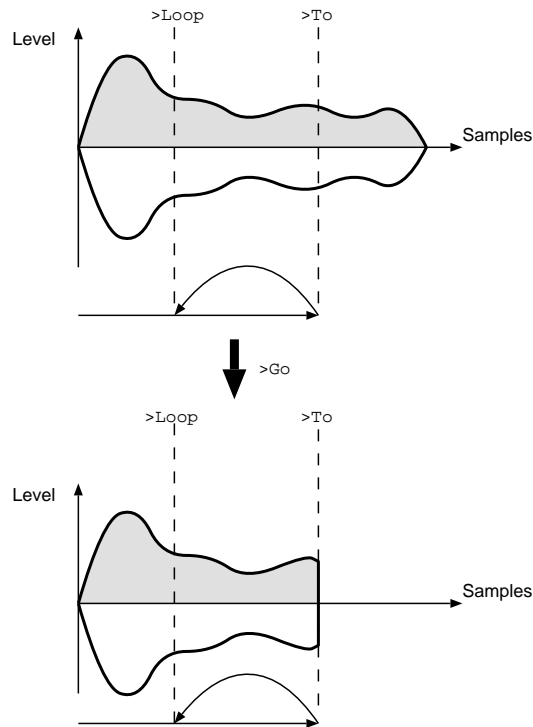
Figure 4.21: Looping the wave

Auto loop

Auto loop is a fascinating tool that makes the loop finding procedure quite easy. In practice you will never need to find the loop manually, instead you let Typhoon find it for you. The `>Auto` option will try to find a loop given the range at `>Loop` ... `>To`. Pressing `ENTER` at `>Auto` will extend the loop start to the next position such that a new suitable loop is found. Different loops can also be obtained by simply moving the loop end to different positions. Figure 4.22 illustrates the procedure.
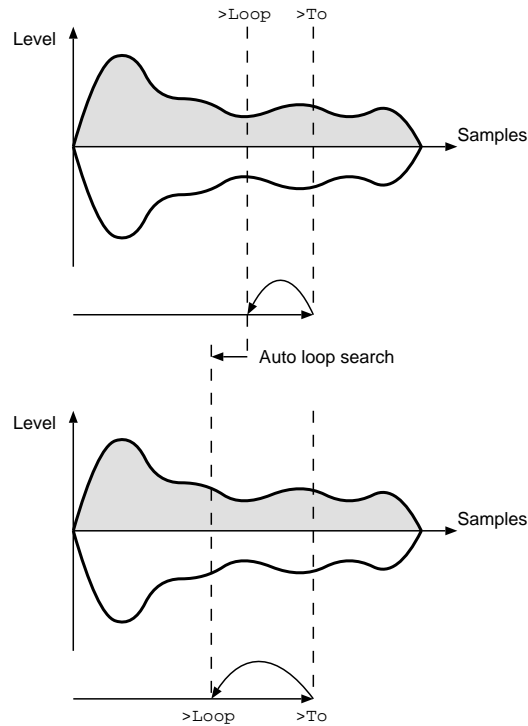
Figure 4.22: Auto loop finding procedure

4.8.3 Pitch

```
>Wave        >Func    ┊>Key >Cent >Auto
001:PIANOC4   3.Pitch ┊ C4   +42
```

Use this option to set the pitch of the wave. Press ENTER at `>Auto` if you want Typhoon to track the pitch for you (strongly recommended).

```
>Wave        >Func    ┊>Key        >Auto
002:SNARE     3.Pitch ┊ none
```

For pitchless waves (e.g. snare drums) you should turn the pitch off. This is done by simply pressing − (on your TX16W keypad) at `>Key`.

4.8.4 S-rate (Sample Rate Conversion)

```
>Wave        >Func    ┊Rate  >New   >Go
004:HIHAT     4.S-rate ┊50000 33333
```

Use this function for sample rate conversion. Enter the desired rate at `>New` and press ENTER at `>Go` to perform the operation.

4.8.5   XFade (Crossfade)

```
>Wave           >Func   ┊>Amount        >Go
002:CHOIR       5.XFade ┊   100%
```

Use this function to make harsh loops sound smoother. An amount expressed in percent of the loop is specified at field `>Amount`. Crossfading means that a given amount before the loop is blended into an equal amount at the end of the loop (see Fig. 4.23).
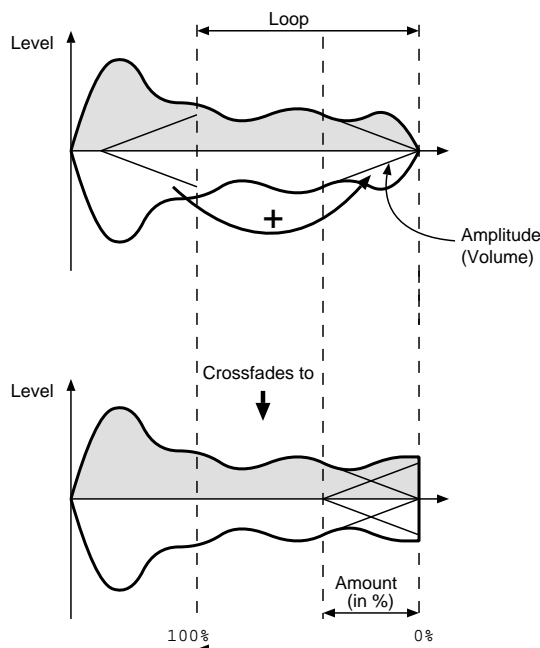
Figure 4.23: Crossfading the wave

4.8.6   Gain

```
>Wave           >Func   ┊>Norm >Gain   >Go
001:GUITAR      6.Gain  ┊       500%
```

Use this function to increase/decrease the gain of the given wave. The gain of the wave is multiplied with the amount given in `>Gain`. However, if the gain is increased, sample points may get clipped and the sound becomes distorted.

You can also normalize the wave (i.e. perform maximal gaining without getting distortion) by pressing ENTER at `>Norm`.

4.8.7   Join & Split

Join

```
>Wave           >Func   ┊>Right wave   >Go
001:CHOIR       7.Join  ┊002:CHOIR R
```

Use this function to create a stereo wave by joining two non-stereo waves. Choose the waveform for the right speaker at field `>Right wave` and press ENTER at `>Go` to perform the operation.
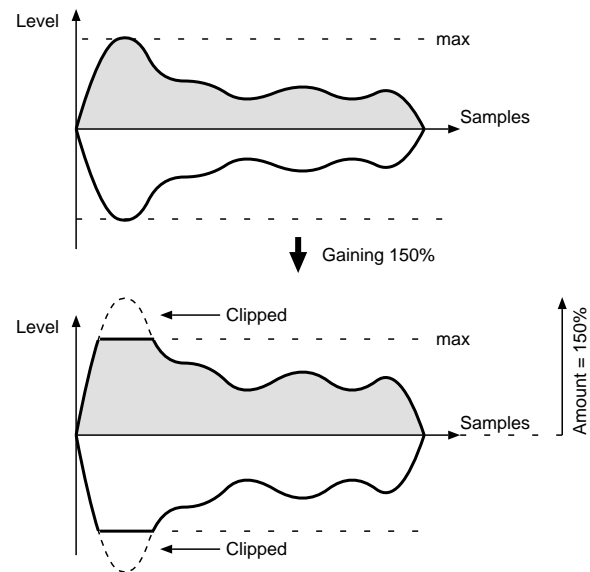
Figure 4.24: Gaining the wave

Note that the waves must be of the same length before joining.

Split

```
>Wave        >Func        ┊           >Go
001:CHOIR₂   7.Split      ┊
```

Use this function to split a stereo wave into two separate non-stereo waves for left and right speakers respectively. The name of the non-stereo wave that previously represented the right speaker is extended with an "R."

4.9   Wave Edit Utilities

Wave edit utilities are utilities for waves only. The menu is activated by pressing the $\boxed{\texttt{UTILITY}}$ button after entering **wave edit**. Two diodes are lit simultaneously indicating the chosen utility menu. (Similar utilities are provided for voices and performances.)

4.9.1   Load

```
>Util   |>Wave                >Test >Go
1.Load  |01:909CRASH
```

The load utility loads the chosen wave. Automatic translation of foreign formats is performed by Typhoon. The following formats are supported:

Compressed   (Default) Waves stored in compressed format.

AIFF   Waves stored as AIFF; a widely available standard.

Yamaha   Waves stored in Yamaha TX16W format.

```
Wave
>909CRASH >ACIDKK >ACIDSNR >AGOGHR16 >C↵
```

It is possible, as usual, to press $\boxed{\texttt{ENTER}}$ at field >Wave to obtain a directory of all the waves stored on the current diskette (as shown above).

```
Loaded wave 909CRASH (requires 32192)
                  Keep [+1]  Unload [-1]
```

Pressing $\boxed{\texttt{ENTER}}$ at field >Test results in loading the wave with the opportunity to undo the operation. This is especially useful to test certain sounds and keep them only if you are satisfied. Press $\boxed{\texttt{+1}}$ to keep the loaded wave, and $\boxed{\texttt{-1}}$ to undo the operation. Pressing $\boxed{\texttt{ENTER}}$ at >Go results in loading the chosen wave without this dialog.

4.9.2   Save

```
>Util   |>Wave           >Format       >Go
2.Save  |001:MAXIKICK    1.Compressed
```

Press $\boxed{\texttt{ENTER}}$ at >Go to save the chosen wave (in memory) as a file to diskette. The format (to save the wave in) is determined at field >Format. The supported formats are the same as for loading.

4.9.3   Delete

```
>Util    |>Wave                         >Go
3.Delete |001:MAXIKICK
```

This utility deletes waves from <u>memory</u>. (Erasing files from diskettes is possible in the utilities of system setup, see section 4.3.6, page 30.) Press $\boxed{\texttt{ENTER}}$ at >Go to remove the chosen wave.

4.9.4   Rename

```
>Util   ┊>Wave          >Name         >Go
4.Rename┊001:MAXIKICK    MEGAKICK
```

This utility renames the chosen wave. Press ENTER at field `>Name` to specify the name. (Move the cursor out of the field range to exit.) Press ENTER at `>Go` to perform the actual operation.

4.9.5   Copy

```
>Util   ┊>Wave          >Name         >Go
5.Copy  ┊001:MAXIKICK    MAXIKIC1
```

This utility makes a duplicate of the chosen wave and gives it the name specified at field `>Name`. Since it is preferable that duplicates have slightly different names, Typhoon will choose a name for you. If you wish to give the duplicate another name, you can do so by pressing ENTER at `>Name`. Press ENTER at `>Go` to perform the actual operation.

4.9.6   Swap

```
>Util   ┊>Wave          >With         >Go
6.Swap  ┊001:MAXIKICK    005:909BD
```

This utility exchanges the two chosen waves. At first glance this seems to be a totally useless function, but it has been shown to be quite the contrary. Consider a percussion where some drum should be replaced by another. It is quite an effort to replace all the occurrences of the wave manually. However, using this utility you do the operation in a single step, and more important, it is equally simple to swap the same items again if you are not satisfied with the the replacement.

4.9.7   Dump

```
>Util   ┊>Wave          >Via          >Go
7.Dump  ┊001:MAXIKICK    1.MIDI
```

This utility dumps the wave via MIDI (`1.MIDI`) or via RS-422 external port (`2.Ext port`) selectable at field `>Via`. Press ENTER at field `>Go` to start the transmission.

4.10   Sample

The default parameters have been chosen user friendly; i.e. the novice should not necessarily have to change them.

To start sampling without changing anything: Go to the field named >Go and press ENTER. A new menu will appear - **the sample monitor**. Go to the field named >Go again and press ENTER: Typhoon will now sample incoming data.

4.10.1   X-trig (Extra Sample Trigger)

```
>Set    |>X-trig >Freq        >Time  >Go
1.Sample|1.None  1.Mono 16k    9000ms
```

As soon as the specified extra trigger becomes active by pressing down a <u>MIDI</u> key or the foot pedal, Typhoon automatically enters **the threshold detection monitor**. However, incoming audio will <u>not</u> be sampled until the audio level (volume) exceeds a specified threshold. Read section 4.10.5 for further information.

X-Trig Type	Description
1.None	Extra trigger not used at all.
2.MIDI	Extra trigger via MIDI note on.
3.Foot	Extra trigger via MIDI foot pedal.

Table 4.11: External triggerings

4.10.2   Frequency (The Frequency)

The sample frequency is a measure of audio quality; the higher frequency the better quality. However, the disadvantage of using high frequencies is the consumption of more memory. Using 50 kHz consumes 50000 sample points (of the sample memory) per second whereas 16 kHz only consumes 16666 sample points per second.

Because of hardware limitations, a sample may not exceed 262144 sample points. This is approximately 5 seconds using 50 kHz and 8 seconds using 33 kHz.

Frequency	Description
1.Mono 16k	Sample frequency 16 kHz mono (worst quality).
2.Mono 25k	Sample frequency 25 kHz mono
3.Mono 33k	Sample frequency 33 kHz mono
4.Stereo 33k	Sample frequency 33 kHz stereo
5.Mono 50k	Sample frequency 50 kHz mono (best quality).

Table 4.12: Available sample rates

4.10.3   Time (The Time Limit)

Measured in milliseconds; i.e. thousands of a second. This parameter designates the maximum elapsed time during the sampling session. If you enter larger values than Typhoon actually can provide, it will default to the maximum value of the system.

Press ENTER at >Go on your TX16W keypad to enter **the sample monitor**.

4.10.4 Auto (Automatically Performed Options)

```
>Set    ┊>Trim >Info >Normalize >Pitch
2.Auto  ┊ on    on    off        on
```

The parameters of this option specify the preferred automatic actions performed after each sampling session. The use of preferences makes the sampling procedure even easier. Work you probably would do manually such as trimming the wave, tracking the pitch, etc. can now be performed automatically after each sampling session. Turn the options **on/off** by pressing $\boxed{\texttt{+1}}$/$\boxed{\texttt{-1}}$ on your TX16W keypad.

`Trim`	Trimming the wave; i.e. cut silent parts at the beginning and the end of the recently sampled data.
`Info`	Let Typhoon perform an objective analysis on the recently sampled data regarding the audio quality.
`Normalize`	Perform normalization of the recently sampled data; i.e. maximize the "volume" without getting distortion.
`Pitch`	Let Typhoon track the pitch of the recently sampled data. Sometimes Typhoon fails to track the pitch, especially on <u>very</u> simple waves such as pure sine waves. Audio without pitch such as <u>drums</u> should be tracked as "none."

4.10.5 The Sample Monitor & Internal Triggering

```
>Auto set >Threshold          >Sample
Level     ■■I■■■■■        □
```

Pressing $\boxed{\texttt{ENTER}}$ at the field named `>Go` in the sample option menu brings you to the internal triggering monitor (as shown above); i.e. setting the threshold level. The incoming signal level is displayed in the field named `Level`. A fat square (to the right) appears if the level exceeds the maximum limit. Sampling audio above this level causes distortion. Arrows next to the field `Level` appear if the input signal is too low (→) or too high (←).

When the audio level exceeds the specified threshold in **the threshold detection monitor**, Typhoon starts to sample incoming audio data. Sound sources in general have a certain level of noise; it is preferable to set the threshold just above this level. This is done either manually or automatically; the former is done by pressing $\boxed{\texttt{+1}}$/$\boxed{\texttt{-1}}$ at field named `>Threshold` and the latter is done by pressing $\boxed{\texttt{ENTER}}$ at field named `>Auto set`. Set the threshold level to zero to disable it. Proceed by pressing $\boxed{\texttt{ENTER}}$ in the field named `>Go`. Doing this brings you to **the threshold detection monitor**.

4.10.6 The Threshold Detection Monitor

```
Status     Freq        Time    Stop [-1]
THRESHOLD  Stereo 33k   3000ms
```

Typhoon will start sampling incoming data as soon as the audio level exceeds the specified threshold. Note that Typhoon supports 250 ms (i.e. $\frac{1}{4}$ second) "presampling" to prevent lost of incoming transients. However, the presampling starts as soon as the user enters the threshold detection monitor. Thus, audio sampled using external triggering when the threshold is disabled will not be presampled at all.

The sampling session is ended either by pressing $\boxed{\texttt{-}}$ on your TX16W keypad or when the time (shown in the field named `Time`) has expired. Switched on auto options are then performed on the recently sampled data.

4.10.7   Resample or Keep the Recently Sampled Data

```
>Name    >Pitch >Cent Dyna    >Retry >Keep
UNTITLED D3     +50   80%
```

The menu shown above appears after each sampling session. If you are <u>not</u> satisfied with the sampling you can either try again by pressing ENTER at the field named >Retry or abort the whole session (without saving anything) by simply pressing any menu button on your TX16W front panel. Pressing ENTER in the field named >Keep will result in saving the recently sampled data as a wave. Further editing can be done through the **wave edit** utilities.

Name	The name of the **wave**. You can enter a new name by pressing ENTER .
Pitch	The pitch of the wave. If the >Pitch (pitch tracking) option is disabled you will have to set this manually, e.g. by pressing +1 / -1 .
Cent	The current pitch within the note; ranging from -50 to +50. This option is used for fine tuning.
Dyna	Dynamics (Dyna) is shown in percent and is only calculated if the >Info option is enabled. The higher the value - the better quality. Not all of the 12 bits are used if the dynamics is less than 50%; this should be avoided.
Clip	Clipping (Clip) is shown in number of sample points and is only calculated if the >Info option is enabled. Clipped sample points result in distortion; thus the higher the value - the poorer the quality. A reasonable amount of clipping is less than 50 sample points (though this issue is quite subjective). To avoid clipping/distortion: Sample with lower gain (adjustable on your TX16W front panel).