OS 1.9 General

Introduction

Dear Wave User,

After two more years of work, I finally succeeded at fixing some bugs fixed and implementing some additional features. Huge work needs a huge amount of time ☺.

This document will give you an introduction to the changes since OS1.7, will guide you through the installation process and will provide new manual pages to expand the original manual with a description of the new functionality. Please refer to the appropriate section and page as marked in this manual.

At this point, I like to thank Waldorf Music, especially Stefan Stenzel, also Jürgen Fornoff and last but not least Hermann. Without their support and initial help, this work would have been IMPOSSIBLE to. Furthermore, I like to thank Till Kopper, Michael Rosner and Bill Sequeira for suggestions, testing, cross reading the manual and general support.

Due to multiple reasons, the installation of the new OS is personalised. Therefore you will need a personal key to run the OS. Details can be found in the section "Installation".

Even if there are additional improvement suggestion today, it is uncertain if I will be able to continue any further development of the Wave OS, simply because the activity is very time consuming and I still do it during my spare time. As an example, I doubt that I will be able to ever build in the missing sequencer, and for sure I will never add any hardware-based options. But nevertheless, if you have any suggestions, send me an email message and maybe there will be a new OS version in the future.

So, I wish you a lot of fun with the Wave and to quote the words of Till Kopper "keep on turning these knobs".

Werner Schönenberger, July, 2010

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Highlights

The new OS offers the following new functionality:

- MIDI synchronisation of LFOs (OS1.8)
- 3rd LFO ("Chopper") added (OS1.9)
- Import of *.WAV files for wave analysis (OS1.8)
- Personal identification (anti-theft) (OS1.9)
- Extension of the Transport buttons (OS1.9)
- Collection of improved functions (OS1.8/OS1.9)
- Collection of fixed bugs (OS1.8/OS1.9)
- Calibration of the pitch bend wheel (OS1.9)

Short Overview

This chapter gives an overview of the features and fixed bugs.

OS 1.902

- When 3rd LFO ("Chopper") is selected and the page of the chopper is changed, any use of an empty fader leads to a crash (i.e. Fader #2, #3 and #8). This bug is fixed
- The Wave now will load the last used performance after booting.
- In the Service Menu, there is a routine to calibrate the pitch bend wheel
- When leaving the Service Menu, the arrangement is loaded correctly

OS 1.901

- 3rd LFO ("Chopper") added
- Menus re-sorted:
    - Option menu transferred to disk menu
    - Info menu transferred from disk menu to global menu
    - Global menu resorted.
- Extension and bug fixing of transport button handling allows the sending of hundreds of MIDI commands by use of the transport buttons (if desired ☺)
- Mute: If mute is off, <shift> <mute> will mute all externals and toggle to previous mute state if pressed again
- Personalise function allows to personalise your Wave (anti-theft)
- Wave configuration is stored on the boot floppy. In the event battery loss it loads the information automatically from floppy or USB floppy emulator.

- Fixed Bug → Floppy: non DOS formatted discs do cause a system crash
- Fixed Bug → Key window: lower limit bug in case of external key windows
- Fixed Bug → Key window: all externals muted does not lead to chaos anymore
- Fixed Bug → Copy: if no instrument is selected, this does not lead to strange behaviour anymore

- Fixed Bug → Velocity Layer: Now works with selected externals
- Fixed Bug → Service: memory test works again
- Fixed Bug → Selecting arrangements with <+> and <-> buttons over bank border will switch on/off the corresponding bank LED.
- Fixed Bug → Externals: Name of external is shown correct if base channel is selected
- Fixed Bug → Transport buttons: for <Rec>, <FF>, <FW> the MIDI string is sent only once
- Fixed Bug → Time increment info display to set time/date increases in 1 sec sequence
- Fixed Bugs → SysEx sound parameter messages are interpreted correctly now (see new SysEx manual for OS 1.9)
- Improvement: SysEx Checksum 00 is interpreted as "no checksum". This makes it easier to program a DAW controller to modify Wave parameters. (see new SysEx manual for OS 1.9)
- Improvement: Slower blinking cursor in Wave table editor
- Improvement: In zoning page, the names of externals are shown
- Improvement: In zoning page, the macros for layer, split etc. are improved. Additionally a "clear" function was added.
- Improvement: In the zoning page, only non-muted instruments/externals are used for performing macros.
- Improvement: In the zoning page, the faders act as volume control (without display of the value).
- Improvement: In zoning detail page, fader for detune, panorama and volume (externals only) were added
- Improvement: In any character input, "clear" deletes without spaces. To delete and fill with spaces, <Shift> "clear" has to be pressed
- Improvement: better tuning process in service routine
- Improvement: MIDI sync to LFO1&2 and Chopper improved (*now it's even better* ☺).
- Improvement: If against all expectations the Wave crashes ☹ and enters the debug screen, pressing <9><9><ok> will reboot the instrument.
- Improvement (also available in OS1.8): in the "store" menu, pressing the hidden function <Shift><Disp3> will ask you for reboot the Wave. This will allow you to load another OS without switching off the Wave – if desired. Hopefully you have not to use this button combination ☺. NB: <Disp3> is the third button from left above the LCD display.

OS 1.802/1.803
- Personal Key "1" feature added.

OS 1.801
- Bug fix of personal key entry.

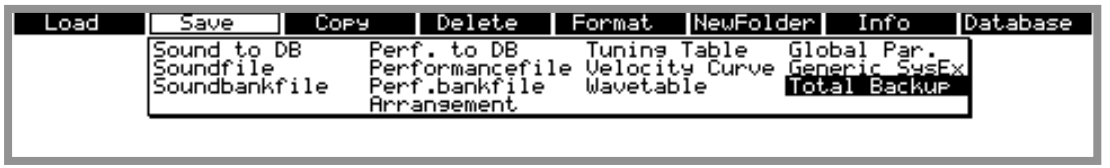
OS 1.800
- The Wave shows a splash screen at start up.
- LFO 1 & LFO 2 independently can be synched to MIDI in various options.
- The Wave now can analyse .WAV files.
- Pedal 1&2 now can be changed in their polarity after boot phase.
- In the Waves Edit mode, in Harmonics Edit, there is a "silence" function, which sets all Harmonics to zero.
- The Wave now maps velocity tables to externals too. This feature is described in the manual but was not implemented.
- The velocity table mapping is fixed.
- In Group Edit now instruments and externals can be switched on again after switching them off.
- The sustain pedal only is sent to externals which are not muted.
- Pedal 1&2 also send only to externals when these are not muted.
- Sending and receiving of the pedals via MIDI now works.
- <Button 1> and <Button 2> work for external Instruments not only on MIDI channel 1.
- The voice allocation bug of OS 1.700 is fixed.
- SysEx store and dump fixed
- Controller 64 – 117 assigned to the Faders now send values 00…127 (not only on/off)
- Aftertouch, Volume, Detune, Pan assigned to the Faders now are correctly displayed
- The MIDI controllers for free wheel up and free wheel down in performance definition now also control free wheel bidirectional parameters
- Some bug fixes were done in the file access functions.

Installation

This chapter describes the installation process step by step. Since you will need a key to install the software, it cannot be done in one single attempt.

Note: IF YOU HAVE ALREADY INSTALLED OS 1.8, NO KEY IS REQUIRED. OTHERWISE, IF THIS IS YOUR FIRST ATTEMPT AT INSTALLING THE NEW WAVE OS YOU WILL NEED TO SEND AN EMAIL MESSAGE REQUESTING A PERSONALISED KEY BY FOLLOWING THE INSTRUCTIONS PROVIDED IN STEP 3 BELOW.

1. As usual before installing a new OS, first make a total backup of your current system by activating the disk functions and then choosing <save>. Then select the function "Total Recall" by using the [+/-] buttons (see figure below).



Press [OK] to go to the selector box for starting the total backup.

2. Create a Wave OS disk and label it with OS 1.901. The disk should include the following files:
   - Init.SND
   - Init.PFM
   - W2Sys.Bin
   - WDV.SYS

   Please make sure that the floppy remains copy un-protected and no other files are stored to provide enough space for the configuration file (see below).

3. If you had already installed OS 1.8.0 or higher please skip to step 5. Otherwise boot the Wave using the new disk. The Wave will boot as usual but will stop with the following:

```
Testing Global Parameters :       OK
Testing Tables          :     10 OK
Reading "WDV.SYS"... done. (15112 bytes read)
Inititalizing Voice Boards:      2 Board(s) OK
Inititalizing Oscillators... waiting...      OK
Inititalizing Oscillators... waiting...      OK
Found 0 Wavetables damaged, now inititalized

Identification Nr: 1E67FA12
Key             :
```

Now it is time to note the *Identification Nr.* (in this example 1E67FA12). This number depends on your instrument. Send this number *together with the serial number of your Wave* (which can be found at the back label) to the e-mail address mentioned in the introduction. After everything is cleared, you will receive a key number for your personal OS version. In the meantime you can reboot your Wave with the former OS (1.7 etc.) and work as you are used to do.

4. After receiving the key number restart your Wave using the OS 1.9 disk. Make sure the floppy protection is set to off, as the Wave will store an additional file in the disk (see section "Bug Fixes & Improvements 1.9" below). Now the system shows the same screen as shown above. At this point, it would be wise to write down the key you received:

KEY : _ _ _ _ _ _

Please enter the key by using the keypad (which also is used for sound selection). If you make a mistake, press <CANCEL> and you can start over again to enter the key. If you finished the entry, press <OK> to accept the key. E.g. the display will show the following (just before pressing <OK>:

```
Testing Global Parameters :       OK
Testing Tables          :     10 OK
Reading "WDV.SYS"... done. (15112 bytes read)
Inititalizing Voice Boards:      2 Board(s) OK
Inititalizing Oscillators... waiting...      OK
Inititalizing Oscillators... waiting...      OK
Found 0 Wavetables damaged, now inititalized

Identification Nr: 1E67FA12
Key             : 123456
```

5. Now the Wave will boot and in the future you will not have to enter the key again - it is kept in the memory. Please proceed with saving a backup of your current Wave on your OS disk (as done in step 1) just for security reasons. *Note:* Since the Wave will write its configuration to the boot floppy, it will take a little longer the first time you boot with OS 1.9 (read Improvement with OS 1.9 below).

Hint (only available with OS 1.802 and higher)

When the backup battery power is down or a sound set of another Wave (OS 1.7 or earlier) is loaded with "Add Wave Specific Parameters" set to "yes", the personal key is destroyed and the identification number at start up does not correspond anymore to the correct one. In this case it is necessary to start the Wave without a key. To solve this issue Key "1" was added. It is possible to start up the Wave **once** and only once by entering the key "1" by pressing <1> on the numeric keypad and accepting it with <ok>. The Wave will boot and then you should immediately load the latest backup made with your own Wave. And of course, load the "Wave Specific Parameters".

When the battery power is down, it is possible to boot the Wave with key <1> every time since the key cannot be stored. But if the battery power is ok and you loaded the wrong sound set as mentioned above, it will **not** be possible to enter key <1> more than once.

Note: You should never load a foreign sound set with "Wave Specific Parameters", because this will destroy the personal settings of your Wave as well as the personal key.

Note: If the battery is still ok, you entered key "1" and you forgot to load the latest backup before switching off the Wave, the only work around is to start the Wave with OS 1.7 or earlier and load the latest backup from there. Then you will have to reboot the Wave with OS 1.9, re-enter the key and everything will be back to normal. Sounds complicated but it isn't.

Improvement with OS 1.9

With OS 1.9 a new concept was added. The Wave stores its configuration information in a file on the BOOT floppy. If the battery is low, the Wave will check the configuration file on the boot floppy. If available, it will let you load the configuration file with all your Wave personal settings. This for as long as you use your Wave's configuration file AND DO NOT MIX IT UP WITH OTHER CONFIGURATION FILES, you will not have to care about the key or Wave specific settings.

Compatibility

All sounds stored with the new software are backward compatible to the old OS. Of course, old OS of the Wave cannot handle new parameters for LFO MIDI synchronisation, 3rd LFO, Transport buttons etc.. Please NEVER load a Wave SET created with OS 1.7 or earlier with "Add Wave Specific Parameters". This will destroy your key and you will have to re-enter it.

Start Up

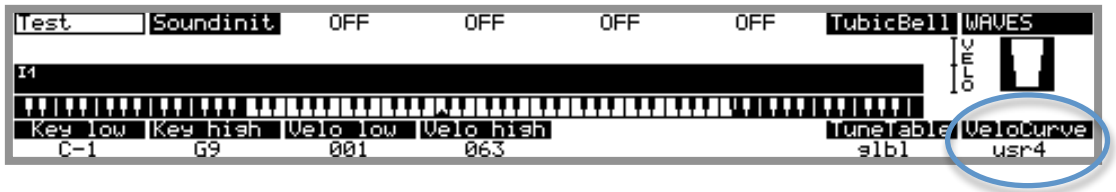
After the final initialisation the Wave will display the following splash screen, showing the current OS and any personalization if entered:

Bug Fixes & Improvements 1.8

This section describes in more detail the different bugs, which were fixed with OS 1.8.

Use Velocity Tables for External

In former versions, velocity tables for external MIDI instruments could be selected but only the linear velocity scale was sent to the MIDI instruments (Parameter "VeloCurve").



OS 1.8 adds the feature to process the selected velocity mapping for external MIDI instruments.

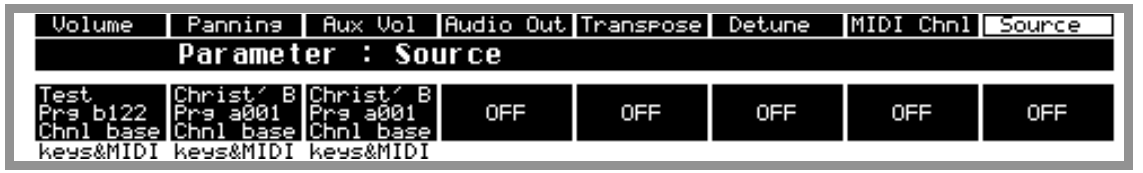
Velocity Table Mapping

In former versions, the mapping of the user velocity tables was wrong.
When selecting *Full*, user table 1 was selected.
When selecting *User 1*, user table 2 was selected.
When selecting *User 2*, user table 3 was selected.
When selecting *User 3*, user table 4 was selected.
When selecting *User 4*, the full table (no velocity) was selected.

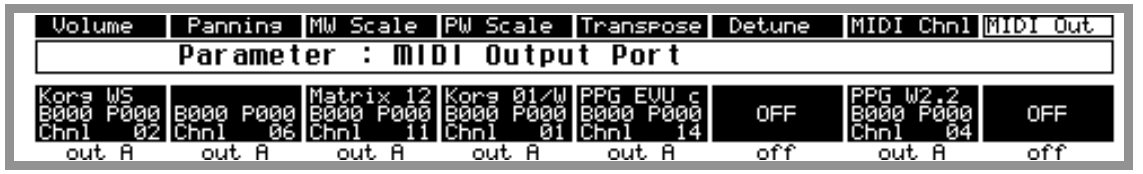
With OS 1.8 the correct user velocity table is selected.

Group Edit: On & OFF for Instruments and Externals

In former versions in page [Group Edit], instruments and externals could not be switched on again after being switched off. The screen is displayed in the [Group Edit] when called from either Page 1 or 2 of Instruments or Externals.



Menu "Source" of Instruments [Group Edit] page did not switch on instruments after having switched them off.



Menu "MIDI Out" of [Externals Edit] did not switch on externals after having switched them off.

With OS 1.8 instruments and externals can be switched on after having switched them off.

Sustain Pedal

In former versions, the sustain pedal was sent to external MIDI instruments, even if they were muted. With OS 1.8, the sustain pedal only is sent to un-muted external instruments only.

Pedal 1 & 2

In former versions, pedal 1 & 2 was sent to external MIDI instruments, even if they were muted. With OS 1.8, the pedal 1 & 2 only are sent to un-muted external instruments only.

Pedal 1 & 2 sending and receiving via MIDI

In former versions, there was a shift in controllers, when pedal 1 & 2 were received by MIDI. This lead to a situation where e.g. pedal 2 had to be sent as "controller X" in order to be received correctly. With OS 1.8, pedals are sent and received correctly.

Buttons 1&2 are sent on all MIDI Channels

In former versions, <Button 1> and <Button 2> were only sent to external instruments, if they were set to MIDI channel 1. With OS 1.8, the buttons are sent to external instruments on any MIDI channel.

Voice Allocation Problem

In version 1.700 there was a voice allocation bug that in certain circumstances lead to missing notes. With OS 1.8, the bug is fixed.

SysEx Problem

In former versions it was possible to store SysEx information on a floppy, but it was not possible to send it back to a MIDI device via MIDI Out. With OS 1.8, the bug is fixed; the Wave can send received SysEx information to the connected instruments.

Fader Assignement of Controllers #65..#117

This is not a real bug. Former versions sent controllers #01..#63 assigned to faders as 00..127 and controllers #64..#117 as on/off (00/127). The latter controllers nowadays are often used as continuous controllers. Therefore the software was changed to send for all controllers #01..#117 a value in the range of 00..127.

Fader Assignement of Controllers #118..#127

In former versions there were a couple of display bugs in the fader handling of specific faders. Aftertouch was not updated correctly in the display when assigned to an instrument. Volume, Detune, Pan and Aftertouch were not updated correctly in the display, when having it assigned to an external. These bugs are fixed with OS 1.8.

Please note that faders assigned to externals will send their MIDI information even if the corresponding external is muted. This is not a bug but intentionally designed this way. With this solution it is possible to control external instrument parameters such as Pan or Volume even when the Wave keyboard does not control it (muted).

Controlling Free Wheel Bidirectional by MIDI

In former versions (and in contrary to the description), it was not possible to control the free wheel if it was assigned as a "free wheel bidirectional" modulation control. Now it can be controlled by the assignments made to Free Wheel Up and Free Wheel Down found in the performance control section. Please keep in mind that MIDI information, received by the controller, assigned to Free Wheel Up (00..127) will create positive information for Free Wheel Bidirectional (00..127). Similar, MIDI information, received by the controller, assigned to Free Wheel Down (00..127) will create negative information for Free Wheel Bidirectional (00.. -127)

Bugfixes in File Access

The following file access bugs were fixed:

- When in a sub folder and saveing a file that already exists, an alert box is displayed. When pressing <cancel> and then selecting menu <close Folder>, an alert box of type "file not found" is displayed and the system enters a loop that only can be ended by saving the file. With OS 1.8, the alert box is not shown anymore and you can exit the menu without an issue.
- When showing an alert box of type "file not found", the file extension is not displayed correctly. This bug is fixed.

Bug Fixes & Improvements 1.9

Where appropriated, this section describes in more detail different bugs and small improvements, which were fixed with OS 1.9.

Key Window: Lower Limit

Upon entering a lower key, the key was shifted to one key lower. E.g. key window C3 - C4, entering the key window resulted in B2 - C4. This bug is fixed.

Sequencer Transport Buttons

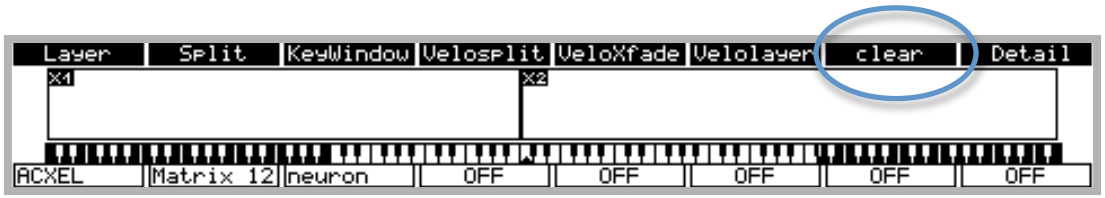
When assigning a MIDI message to a transport button, the message will be sent only when pressing the button in case of "stop", "play", "Locator in" and "Locator out". But when pressing and releasing ">>", "<<" or "Rec" the message was sent twice. Now all MIDI messages are sent once for all transport buttons.

Note: The handling of Sequencer Transport Buttons was improved. See section "Global Edit" about MIDI settings on page 8.0.7ff.

Zoning Page

Zoning page has some very nice improvements. For internals and externals, the basic zoning has a new function "clear" available at display button #7, which resets the zoning when pressed. In other words, all sounds are set to

- Complete keyboard range
- Full velocity
- Panorama in middle position
- No detune



For externals the name of the external is shown in the lower part. In this example X1 equals to "ACXEL" and X2 equals to "Matrix 12". This shall help to identify the current external.

For internals and externals, layer and split functions only work on non muted instruments. If for example you want to set a split for "ACXEL" and "Matrix 12" only, you have to mute "neuron". To do that press <mute> and then <disp3> (display button #3), which represents the "neuron" instrument as indicated at the lower part. To leave the mute mode, press <shift><mute>. You note that the "neuron" instrument is

flagged with a red LED. Then press the "split" button (display button #2). Then you will be asked if you want to set a split point for two instruments. You answer with <OK> and set the split point.

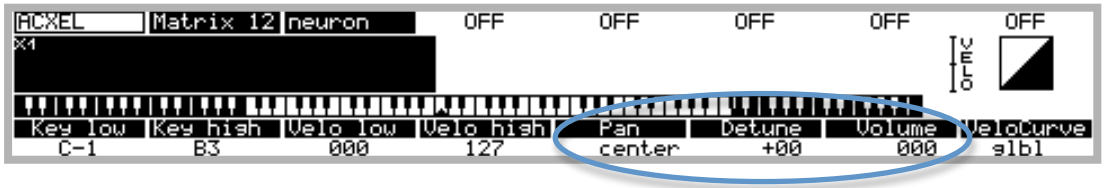
Note: if you like to use macros for ALL instruments, even the muted one just use the <shift> key and the appropriate key. E.g. use <shift> <disp2> (display button #2 for "split") and now the Wave asks you to set two split points for three instruments.

A new feature is now allows the faders to work as volume controls for internal and external instruments (without display). So you can mix the sounds in the zoning page as well.

Also the macros were improved. Layer will now spread the sound in the panorama and slightly detune it which generates a brute forced power sound ☺. Split will set key windows but no pan, velocity or detune values.

Zoning Detail Page

In the zoning detail page, for internals and externals it is possible to adjust the panorama position, detune and volume (external only) for the instrument. For internals, "tune table" is selected at position #7.



Also for externals, the name of the external is displayed in the header row for better identification. In this example, again X1 equals to "ACXEL".

Text entry

Pressing the "clear" key on the keyboard when entering text is used to replace the entire text by spaces. This is not desirable in all cases. Now "clear" just deletes the text. If you have to clear by replacing the text with spaces, press "shift" and "clear" on the keyboard.

Empty Battery

When the battery is empty the Wave loses all its specific data. So after replacing the battery, the Wave specific data has to be loaded by use of the backup made on the very same Wave. To avoid this procedure, the Wave stores its specific settings in a "Wave.CFG" file on the boot floppy. Now when the battery is exchanged, the Wave will

boot and ask for the key. You enter "1" and the Wave will reload the specific settings from the file. Then you can load any backup created on any Wave.

Menu Reorganisation

The "Import" function was introduced with OS 1.700 (which lets you import sounds from a *.SET file) was originally invoked by pressing the [Option] page (by pressing the button at the right side of the display). Since this function belongs to the [Disk] page, it was exchanged with the "info" menu in the [Disk] page. The "info" menu is moved to the [Global Edit] and the "Global" page is COMPLETELY RESTRUCTURED. Find more information below.

Service Menu

The service menu can be invoked by pressing <Shift> and <Disp#7> in the "Store" menu. In this menu, the filters tuning procedure is improved. Now the octave has been rearranged for a better tuning process and the modes are renamed to "vcf tune", "osc. ref" and "tune/ref.". Additionally a mode "fix.pitch" is implemented which fixes the pitch. Best procedure is:

1. set "fix.pitch" and octave = 0 and identify coarse interval
2. set octave = +2 and identify the upper crossing where beat frequency starts
3. set octave = +2 and identify the lower crossing where beat frequency starts
4. do the arithmetic average

Up to this version the Wave does not support any calibration of the pitch wheel. The only possible calibration of the wheel is a mechanical adjustment of the potentiometer linked to the wheel. Now a new teaching procedure in the service menu allows you to calibrate the pitch wheel of your Wave in case of the following symptoms:

- without moving the wheel the pitch drifts from the zero value when the bend range in the oscillator edit screens is increased up to +12 (or -12)
- - the octave interval cannot be gained with the pitch wheel in one or both directions, when the the bend range in the osciallator edit screens is set to +12 or -12

If your wave does not have such symptoms (as mine does not), there is NO need for a calibration.

In the upper line below the the display buttons the information for calibration is shown. Inversed boxes show active button functions.

- <Disp#1>: Text "PitchBend" indicates pitch bend settings
- <Disp#2>: "C :xxxx" shows the actual value of the pitch wheel, e.g "C :2015"
- <Disp#3>: "Mi:xxxx" shows the minimal value of the pitch wheel
- <Disp#4>: "Z :xxxx" shows the center value of the pitch wheel
- <Disp#5>: "Mx:xxxx" shows the maximal value of the pitch wheel
- <Disp#6>: "Reset" is shown which sets the values to the default parameters.

Thus, <Disp#3> to <Disp#6> are active. For information, the ideal range of the pitch bend whell is 0000 to 4096. The following process describes the calibration of the pitch wheel:

1. Move the pitch wheel to the lowest position, which should be around "0000". Try it several times to be sure to find the lowest point.
2. Hold the wheel and press <Disp#3> to set the lowest point. The display will show it e.g. as "Mi:0000"

3. Slowly move the pitch wheel from the lowest position to the zentral position. Repeat this procedure and note (write down) the mean value as lower center point. E.g. this point is "C :1966"
4. Slowly move the pitch wheel from the highest position to the zentral position. Repeat this procedure and note (write down) the mean value as upper center point. E.g this point is "C :2066". *Note:* The upper center point will differ from the lower center point.
5. Take the mean value of the lower center point and the upper center point as the center point and try to set the current pitch bend value near to this calculated center point. E.g. this point is "(1966 + 2066)/2" which is "2016". In this case, try to set the current value by movement of the pitch bend wheel to "C: 2016".
6. Hold this value and press <Disp#4> to set the center point according to the currently set pitch bend value. The display will show it as "Z :2016"
7. Move the pitch wheel to the upper most position, which should be around "4096". Try it several times to be sure to find the upper most point.
8. Hold the wheel and press <Disp#5> to set the upper most point. The display will show it e.g as "Mx:4080"

Now the calibration porcess is finalized.

Please note the following:

- <Disp#5> will RESET the calibration value to the defaults which are "0" for lower limit, "2048" for center and "4096" for upper limit

- If two of the calibration data are set to the same value (e.g. lower limit is set to "2040" and center point is set to "2040") a reset will be executed and all values are set to its default
- The center point has a zero zone of about +/- 200 where values are treated as "0". E.g. if your zero value is "2016, all values between "1816" and "2216" are treated as "0".
- The calibration procedure is not intended to use it as a feature for inversion of the pitch wheel or similar features and might lead to unexpected behaviour if not used in the appropriate way.
- A calibration of the modulation or free wheel is not intended, since these wheels do not offer a center position
- Whenever the service menu is left by pressing <cancel> or <ok>, ALL edits are stored and a new config file will be created during NEXT boot time of the Wave, which will extend the boot procedure for this onetime operation.

Please keep in mind that changing the tuning needs some experience. So please be careful when acting in this page.

Known Issues

Below is a list of known issues that remain to be fixed. Please send a note to the address noted during the introduction if you know of a problem not included in the list below.

- Occasionally, notes are hanging. These notes can be switched off by pressing <Cancel> and <OK> simultaneously.
- There were no changes made to the database. So the stability of the database still is not ok.
- MIDI Bank Select is not implemented correctly. But since the Wave offers only 2 Banks and it is possible to switch between the two banks, this bug fix was omitted by intension.
- Wave Edit: incorrect phase for additive wave generation.
- Wave Edit: Strange behaviour if auto-scale is switched on and all harmonics are set to 0.
- Wave Edit: strange behaviour of endless potentiometers.
- Wave Edit: Strange screen update in blend modus.
- Wave Edit: Incorrect initialisation of lower limit at wave table selection.
- In the Globals page when selecting "globals" when "globals" is already selected or "MIDI" when "MIDI" is already selected, the menu is displayed in black instead of white. This is a minor bug that might be fixed somehow in the future.

This chapter describes all parameters and functions that globally affect the Wave (but not individual Performances or Sounds) including programming user velocity curves and tuning tables. The page is completely redesigned with OS 1.9

About Global Edit

All parameters you find in Global Edit will have an effect on the entire Wave, as opposed to Performance or Sound parameters that are valid only for the particular program. You'll find various groups of parameters in Global Edit. The page is composed of different menus and drop-down menus, which can be accessed by use of the display buttons above the corresponding menu:

All menus, except "PerfPCMap" and "SoundPCMap", support drop-down menus, offering more selections.

- To select one of the menu items, simply press the respective display button of the menu until the entry you wish to choose is highlighted. The display button will cycle back to the top of the list automatically.

- To acknowledge, press the [OK] button; [Cancel] aborts

Info Menu

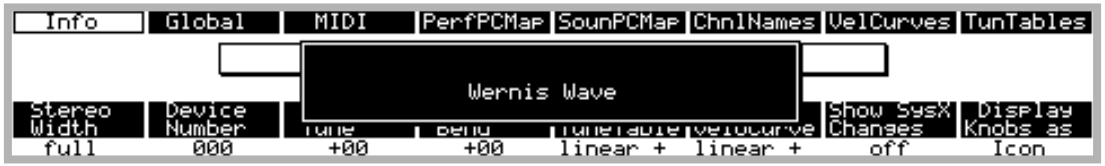
The "Info" menu offers four sub-selections.

- "Operating System" gives the information about the OS and sub systems and the creation date of the system as it formerly was in the "Disk" page.

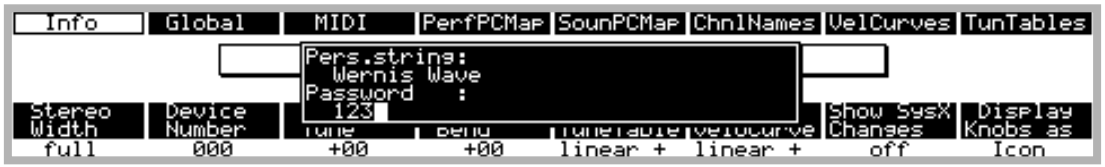
- "Time and Date" lets you adjust the time and date of the system formerly found in the "Disk" page.

Adjust the new date & time with the corresponding faders and press <OK> to accept the changes or press <Cancel> to discard them.

- "Identification" shows the personal identification of your Wave as it is shown at startup.



- "Personalise" let you enter you're a personal identification string. When selecting the menu for the first time the system will prompt for a personalisation string and a password.



First enter the personal identification and press <OK>. The cursor will move to the line password. Enter a password and make a note of it. Best location is here.

PASSWORD : __ __ __ __ __ __

Then press <OK> to end the entry. After the next reboot, the personal identification will be displayed below the WAVE logo at the splash screen.
The idea behind personalising is the following: In case of a theft, the serial number and your personal identification can identify your Wave. Even when erasing the memory, it will not be possible to boot the Wave with OS1.9 without either a key or the original boot disk where the personal identification is stored in the "Wave.CFG" file.
Attention: Whenever you intend to change your personal identification by using the "Personalise" menu, you will be requested to enter your password. If you have lost it there is NO WAY AROUND IT, nobody can help you. So please be careful.

Global

The menu "Global" has two sub menus, "Global 1" and "Global 2".

Press the display button #2 until the desired menu is selected, then press <ok>.

Global 1 Parameters

Selecting the "Global 1" menu shows the global functions as displayed before.

Global 2 Parameters

In [Global Edit] in the menu "Global 2", a function is added which allows the user to change the polarity of pedal 1 & 2 after start up. Since only one parameter was left to this screen, one single slider handles the functionality. The following picture shows the screen

P.C.Voice Mode

Range: ring / shut

This parameter was available in former versions. It defines what happens to still sounding voices when doing a program change

- *ring:* This will let the voices ring. With long release times, this might not be ideal. And then again, it may be just what you want.
- *shut* : Still sounding voices will be cut off at a program changes.

Once again, the choice is yours.

SystemVol to Xtr.

Range: off / on

This parameter was available in former versions. It defines whether the System Volume knob next to the wheels shall also control the MIDI devices connected to the Wave via the Externals. If set to *on*, the programmed MIDI volume of each External will be scaled.

See chapter 2.22, "About Volume", for details of how the volume structure works in the Wave.

Global Transpos

Range: -12 / +12

This parameter was available in version 1.680 and allows the user to transpose the whole instrument in half tones. +12 to transpose up for one octave, -12 transposes down for one octave.

Polarity Ped1|Ped2

Range: neg|neg, neg|pos, pos|neg, pos|pos

This parameter is new and allows the user to manually override the polarity of pedal 1 & 2 after start up. Usually the pedals are scanned when powering-up and their

respective functions are set accordingly. But should there be a problem, you might fix it by trying another polarity. Since one slider is used to control two parameters, the two parameters are separated by a "|". The following table explains the values:

- *neg|neg:* Pedal 1 has **negative** polarity and pedal 2 has **negative** polarity
- *neg|pos:* Pedal 1 has **negative** polarity and pedal 2 has **positive** polarity
- *pos|neg:* Pedal 1 has **positive** polarity and pedal 2 has **negative** polarity
- *pos|pos:* Pedal 1 has **positive** polarity and pedal 2 has **positive** polarity.

Sustain Pedal

Range: opening, closing

This parameter was available in version 1.680 and allows the user to set the polarity of the sustain pedal.

Glide Window

Range: 01…20

This parameter was available in former versions. It governs the recognition of chords and intervals that are meant to be a logical entity. The higher the setting of the glide window is, the more accurate chords will be recognised. At the same time, however, the note-on response will be worsened. Therefore you should try to set this parameter as low as possible.

See Sound Design, chapter 3.42, "Glide", for more information on the specific algorithm and this parameter.

Sys Ex MIDI Port

Range: off / Out A / Out B

This parameter was available in former versions. It allows you to select the MIDI port from which the Wave's MIDI system-exclusive data will be transmitted. The following data are included:

- Sys-ex dumps done via the [Store] function
- Sys-ex front panel transmission

- Sample dump requests transmitted while in the Wave Edit mode
- Sys-ex data transmitted from disk using the <Generic Sys-Ex> dump function

The following parameter options are available:

- *off:* No system-exclusive messages will be sent. This option should only be used for debugging a complex MIDI system, or when the connected MIDI equipment seems to have trouble receiving a Wave sys-ex message.
- *Out A:* All of the above-mentioned system-exclusive messages will be transmitted from the Wave's MIDI Out A.
- *Out B:* All of the above-mentioned system-exclusive messages will be transmitted from the Wave's MIDI Out B.

➪ In general, you should set this parameter to the MIDI Out that is connected to your sequencer or computer, thus allowing sys-ex transfers and the recording of any front-panel changes you make. If you set the parameter to *off*, you will not be able to transmit any sys-ex data.

➪ The Wave will *always* accept incoming sys-ex messages – provided they make sense. See the chapter on receiving sys-ex data for details.

Prg Change Mode

Range: multi / individ. / combined

This parameter was also available in version 1.680. It determines how a Performance responds to an incoming MIDI program change command. Depending on the programmed value, it will allow the MIDI PC(program change) to change either the Performance itself, the Sound or both.

No matter how the Program Change Mode parameter is set, the incoming program changes must match the respective MIDI channels they are meant for, otherwise they will be ineffective.

- *multi:* MIDI program changes will only switch the Performance. The program change must be received on the base channel, otherwise it will be ignored by the Wave.

- *individ.*: MIDI program changes will only switch the Sounds of the Instruments in the Performance. The received program change must match the MIDI channel of the Instrument it is intended for. If more than one instrument receives on the same MIDI channel, all will address the sound specified by the program change upon reception. If no Instrument receives on the MIDI channel on which the program chang is transmitted, the Wave will ignore the program change.

- *combined:* Both Performances and Sounds can be changed via MIDI program changes. A program change meant to switch the Performance must be received on the base channel; program changes meant to change the Sounds of Instruments must be received on the MIDI channel of the respective Instrument. If an Instrument's MIDI receive channel is set to *base*, or to the same MIDI channel as the base channel, a program change meant for that Instrument would change the Performance, as it takes precedence when receiving a MIDI program change.

MIDI

The "MIDI" menu now has also two sub menus, "MIDI General" and "Transport Buttons".

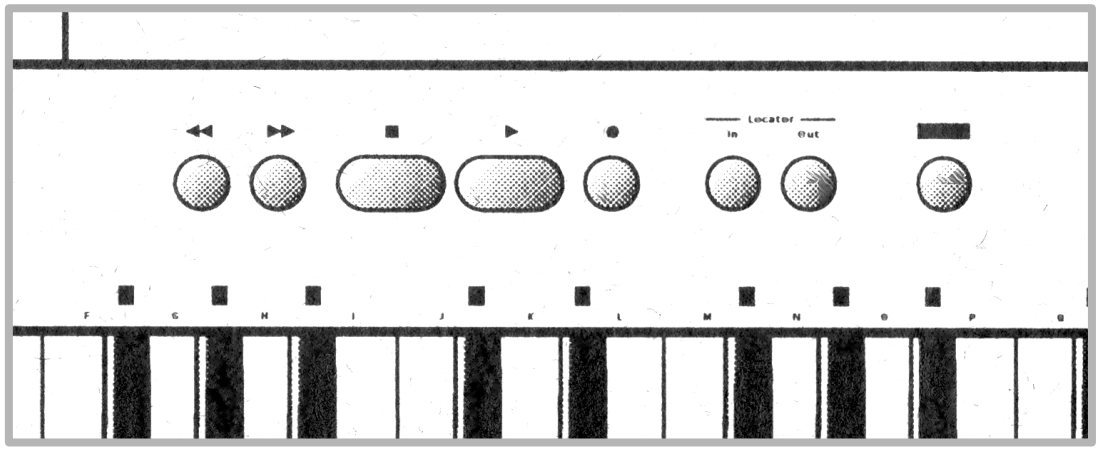
Press the display button #3 until the desired menu is selected, then press <ok>.

MIDI General

Selecting the "MIDI General" menu shows the MIDI settings as it already was used before.

Transport Buttons

The "Transport Buttons" menu offers the possibility of assigning MIDI strings to the Wave transport buttons to be sent out via the Wave's SysEx output.



The following display will show up:

You can leave the menu by pressing <Cancel> or your can press any of the seven transport buttons (marked as <tb> in the dialogue) as well as one of the transport buttons in combination with the <shift> button (marked as <shft><tb> in the dialogue). This will give you a total of 14 transport button combinations. For example you can use <Shift><Locator In> to define a MIDI string that sets the "punch in" point and use <Locator In> to define a MIDI string to jump to the punch in point

If you press any of the transport buttons, say for example <shift><Locator In> the display will show the following screen:

Note the indication "<s><LcIn>" which is an abbreviation of the buttons <shift> and <Locator In>. The abbreviations are:

<s>: <Shift>
< << >: <FW> equals to "Fast Rewind"
< >> >: <FF> equals to "Fast Forward"
<Stop>: <Stop>
<Play>: <Play>
<Rec>: <Record>
<LcIn>: <Locator In>
<LcOt>: <Locator Out>

The display also indicates the number of bytes reserved for the MIDI string. In the example above, 4 bytes will be sent when pressing the transport button <shift > <Locator In>. The data has to be entered in hexadecimal data format, which requires your knowledge of MIDI data representation.

Please note, that ANY byte combination can be sent, regardless of their adherence to the MIDI protocol format or not. Therefore you should take adequate provisions to follow the MIDI protocol; otherwise the target system will not be able to interpret your data. In this dialog it is possible to do the following:

Fader #4: MIDI String Size

Range: 0…32

Fader #4 below the indicator "bytes" defines the number of bytes that will be sent when pressing the appropriate transport button. Up to 32 bytes can be sent. When the MIDI string size is set to 0, no data is sent to the device. Whenever the fader is moved, the cursor is set to the end position of the string.

Keyboard: Data Entry

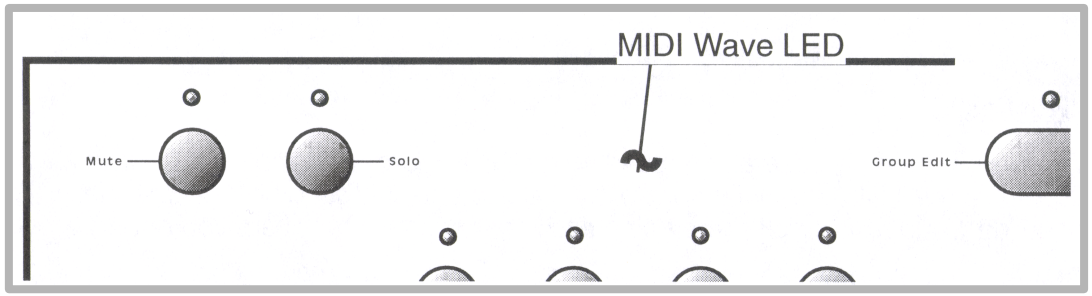
Range: <, >, |<, 0..9, A..F, #

Use the keyboard according to the labels printed above the black and white keys to enter hex numbers and navigate through the dialog. The following keys are allowed:

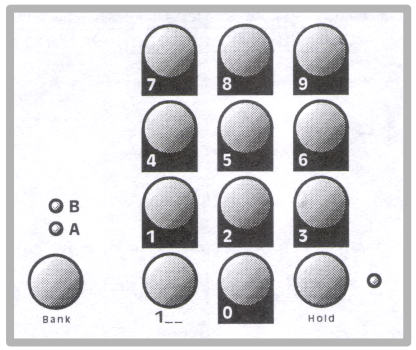
- 0..9, A..F is used to enter hex data. After entering a byte, the cursor is moved forward to the next position
- < is used to move the cursor to the preceding left position
- > is used to move the cursor to the following right position
- |< is used to move the cursor to the beginning of the string (first position)
- # is used to enter the "keypad place holder" which is used to enter a digit (see below). In the example above, the "keypad place holder" is set at the third position of the string. *Note:* Since internally the placeholder is also used, a byte has to be reserved as an indicator. In this particular situation the byte $FD is used (an undefined MIDI command). So entering F and D by the keyboard will lead to the same result and is displayed as the placeholder (##)

Please note that there is no byte editing (not possible to insert or delete a byte). All bytes have to be entered when modifying an existing string, thus overwriting the existing string.

A word about the "keypad placeholder". Current applications allow multiple markers to be set. Therefore a possibility to define more than one marker has to be created and this is done by use of the "keypad placeholder". When pressing a transport button (e.g. <shift> <Locator In> as the example above) the Wave will indicate by the switched on MIDI LED that it awaits an input.



Now you have to press one key of the keypad (0..9).



The MIDI string will be completed and sent and the MIDI LED will be switched off. Sounds complicated but it is simple in practice. Referring to the example above

- <shift> <Locator In> will switch on the MIDI LED
- Keypad <5> will switch off the MIDI LED and finalise the string
- Then $F0 $0D **$05** $F7 will be sent, where $xy represents a hexadecimal number

Another example: <shift> <Locator In> Keypad <8> will send $F0 $0D $08 $F7 to the output port. Please note that you can have multiple "keypad placeholders" in a MIDI string that can hold different numbers. E.g. by use of two sequential placeholders, it is possible to define 100 markers. Therefore almost infinite amount of MIDI strings are possible ☺ – but you have to enter a key for each placeholder.

Performance PC Map

The "Performance PC Map" menu is not changed and corresponds to page 8.9 in this section.

Sound PC Map

The "Performance PC Map" menu is not changed and corresponds to page 8.9 in this section.

MIDI Device Names

The "MIDI Device Names" menu is not changed and corresponds to page 8.11 in this section.

Velocity Curves

The "Velocity Curves" menu is not changed and corresponds to page 8.12 in this section.

Tuning Tables

The "Tuning Tables" menu is not changed and corresponds to page 8.13 in this section.

This chapter tells you all about the built-in floppy disk drive, everything you can do with it, and how to operate all associated functions. Please refer to the next chapter, *Database Functions,* which covers that specific function of the disk-drive.

Note: This first part only describes the OS 1.9 based changes to the [disk] page. The original introduction can be found at page 10.1.1.

Changes to the Disk Page

The [Disk] page was slightly change by moving the menu "info" to the [Global Edit] page and inserting the menu "import" of the page [Option]. This gives the following screen.

In this chapter only the menu "Import" is discussed (already available in OS 1.700). All other menus are discussed in page 10.1 and beyond.

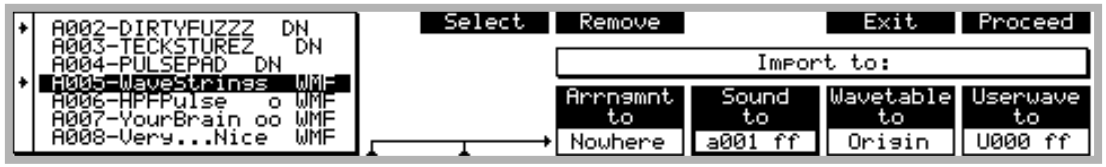
The menu "Import" allows you to import selected arrangements, sounds or waves from a *.SET file. Pressing display button #7 leads to the following display:

The display shows all available *.SET files (e.g. WAVE.SET) and allows you to select one of these files as the import source. Select the *.SET file as you do in a restore task. By pressing <Cancel> you discard the function, by pressing <OK> you load the file. After loading, the following import type selection page is displayed:

Now you have to define the data you want to import. You can import Arrangements (Display button #1), Sounds or wavetables. To go back "unload" the *.SET file.

Import Arrangements

Choosing "Arrngmnt" lets you select the arrangements to import according to the following screen.



The following fader functions can be used:

Fader #1: Bank

Range: A…B

Fader #1 sets the cursor to the bank to load from, "A" or "B"

Fader #2: Arrangement

Range: 001…128

Fader #2 sets the cursor to the arrangement you want to select. The cursor in the example above is set to 'A005-WaveStrings WMF'.

Fader #3: Target Bank

Range: A…B, a…b, 0..9

Fader #3 defines the target bank or the user wave range (see below) for the data import in the selected area (see below). In the example above it can be used to set the target bank in the "Sound to" area from 'a001 ff' to 'b001 ff' or vice versa. *Note:* This fader has no function if no area is selected or if in the wavetable area (see below).

Fader #4: Target Index

Range: 001...128

Fader #4 defines the target index for the data import in the selected area (see below). In the example above it can be used to set the target index in the "Sound to" area from 'a001 ff' to 'a128 ff'. *Note:* This fader has no function if no area is selected.

Fader #5: Target Arrangement

Range: Nowhere, Origin, A001ff...A128ff, B001ff...B128ff

Fader #5 selects the arrangement area and defines the target. When selected, fader #3 and #4 will act on the arrangement area. If selected, a thick border highlights the "Arrngmnt to" area.

- *Nowhere:* The import will not affect the arrangement itself at all. Only other parts of the arrangement (sounds, wavetables, user waves) might be imported.
- *Origin* : The selected arrangements will be imported to the same position as in the original *.SET file.
- *A001ff...A128ff, B001ff...B128ff* : The selected arrangements will be imported to the defined position and its following positions. E.g. defining 'A032 ff' will import the selected arrangements to A032, A033 etc..

Fader #6: Target Sound

Range: Nowhere, Origin, a001ff...a128ff, b001ff...b128ff

Fader #6 selects the sound area and defines the target. When selected, fader #3 and #4 will act on the sound area. If selected, a thick border highlights the "Sound to" area as shown in the example above.

- *Nowhere:* The import will not affect the sounds of the arrangement. Only other parts of the arrangement (arrangements, wavetables, user waves) might be imported.
- *Origin* : The sounds of the selected arrangements will be imported to the same position as in the original *.SET file.

- *a001ff...a128ff, b001ff...b128ff* : The sounds of the selected arrangements will be imported to the defined position and its following positions. E.g. defining 'b067 ff' will import the sounds of the selected arrangements to b067, b068 etc..

Fader #7: Wavetable

Range: Nowhere, Origin, W065ff...W128ff

Fader #7 selects the wavetable area and defines the target. When selected, #4 will act on the wavetable area. If selected, a thick border highlights the "Wavetable to. Please note that in this case, Fader #3 is not active.

- *Nowhere:* The import will not affect the wavetables of the arrangement. Only other parts of the arrangement (arrangements, sounds, user waves) might be imported.

- *Origin* : The wavetables of the selected arrangements will be imported to the same position as in the original *.SET file.

- *W065ff...W128ff* : The wavetables of the selected arrangements will be imported to the defined position and its following positions. Please note that wavetables 001 to 064 are fixed wavetables and cannot be changed. E.g. defining 'W007 ff' will import the wavetables of the selected arrangements to W007, W008 etc..

Fader #8: User Wave

Range: Nowhere, Origin, U000ff...U999ff

Fader #8 selects the user wave area and defines the target. When selected, fader #3 and #4 will act on the user wave area. If selected, a thick border highlights the "Userwave to" area.

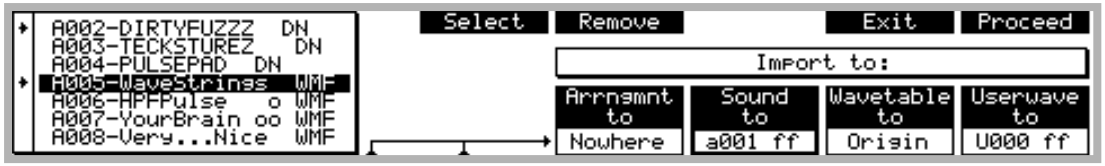
- *Nowhere:* The import will not affect the user waves of the arrangement. Only other parts of the arrangement (arrangements, sounds, wavetables) might be imported.

- *Origin* : The user waves of the selected arrangements will be imported to the same position as in the original *.SET file.

- *U000ff...U999ff* : The user waves of the selected arrangements will be imported to the defined position and its following positions. Please note that fader #3 will change the hundreds of the target, U000, U100, U200 etc., and fader #4 will change the rest of the index, e.g. U300..U399. E.g. defining 'U456 ff' will import the user waves of the selected arrangements to U456, U457 etc..

Display Button #4: Select

Pressing "Select" will select the Arrangement at the current position and mark it with a little arrow. In the example below, A002 and A005 are selected.



Display Button #5: Remove

Pressing "Remove"will remove the Arrangement at the current position form the selection list and also remove the little arrow mark.

Display Button #7: Exit

Pressing "Exit" or <Cancel> will exit the page without any import and display the import selection type page.

Display Button #8: Proceed

Pressing "Proceed" or <OK> will execute the import and to the import selection type page.

Import Sounds

Choosing "Sound" at the import type selection page lets you select the sounds to be imported according to the following screen.

The following fader functions can be used:

Fader #1: Bank

Range: a…b

Fader #1 sets the cursor to the bank to load from, "a" or "b"

Fader #2: Sound

Range: 001…128

Fader #2 sets the cursor to the sound you want to select. The cursor in the example above is set to 'a004-TEXTURES DN'.

Fader #3: Target Bank

Range: a…b; 0..9

Fader #3 defines the target bank or the user wave range (see below) for the data import in the selected area (see below). In the example above it can be used to set the target bank in the "Sound to" area from 'a001 ff' to 'b001 ff' or vice versa.

Fader #4: Target Index

Range: 001…128

Fader #4 defines the target index for the data import in the selected area (see below). In the example above it can be used to set the target index in the "Sound to" area from 'a001 ff' to 'a128 ff'.

Note: Fader #5 has no function in this page.

Fader #6: Target Sound

Range: Nowhere, Origin, a001ff…a128ff, b001ff…b128ff

Fader #6 selects the sound area and defines the target. When selected, fader #3 and #4 will act on the sound area. If selected, a thick border highlights the "Sound to" area as shown in the example above.

- *Nowhere:* The import will not affect the sounds itself. Only other parts of the arrangement (wavetables, user waves) might be imported.

- *Origin* : The sounds will be imported to the same position as in the original *.SET file.

- *a001ff...a128ff, b001ff...b128ff* : The sounds will be imported to the defined position and its following positions. E.g. defining 'b067 ff' will import the sounds to b067, b068 etc..

Fader #7: Wavetable

Range: Nowhere, Origin, W065ff...W128ff

Fader #7 selects the wavetable area and defines the target. When selected, #4 will act on the wavetable area. If selected, a thick border highlights the "Wavetable to. Please note that in this case, Fader #3 is not active.

- *Nowhere:* The import will not affect the wavetables of the sounds. Only other parts of the sounds (sounds, user waves) might be imported.

- *Origin* : The wavetables of the selected sounds will be imported to the same position as in the original *.SET file.

- *W065ff...W128ff* : The wavetables of the selected sounds will be imported to the defined position and its following positions. Please note that wavetables 001 to 064 are fixed wavetables and cannot be changed. E.g. defining 'W007 ff' will import the wavetables of the selected arrangements to W007, W008 etc..

Fader #8: User Wave

Range: Nowhere, Origin, U000ff...U999ff

Fader #8 selects the user wave area and defines the target. When selected, fader #3 and #4 will act on the user wave area. If selected, a thick border highlights the "Userwave to" area.

- *Nowhere:* The import will not affect the user waves of the sounds. Only other parts of the sounds (sounds, wavetables) might be imported.

- *Origin* : The user waves of the selected sounds will be imported to the same position as in the original *.SET file.

- *U000ff…U999ff* : The user waves of the selected sounds will be imported to the defined position and its following positions. Please note that fader #3 will change the hundreds of the target, u000, u100, u200 etc., and fader #4 will change the rest of the index, e.g. U300..U399. E.g. defining 'U456 ff' will import the user waves of the selected arrangements to U456, U457 etc..

Display Button #4: Select

Pressing "Select" will select the Sound at the current position and mark it with a little arrow. In the example below, a001, a003 and a004 are selected.

Display Button #5: Remove

Pressing "Remove" will remove the Sound at the current position form the selection list and also remove the little arrow mark.

Display Button #7: Exit

Pressing "Exit" or <Cancel> will exit the page without any import and display the import selection type page.

Display Button #8: Proceed

Pressing "Proceed" or <OK> will execute the import and to the import selection type page.

Import Wavetables

Choosing "Wavetable" at the import type selection page lets you select the wavetables to be imported according to the following screen.

The following fader functions can be used:

Note: Fader #1 has no function in this page.

Fader #2: Wavetable

Range: 065...128

Fader #2 sets the cursor to the wavetable you want to select. The cursor in the example above is set to 'WT069-FMGlock'.

Fader #3: Target Range

Range: 0..9

Fader #3 defines the user wave range (U100, U200, U300 etc.) for the data import in the selected area (see below). In the example above it can be used to set the target bank in the "Userwave to" area from 'U054 ff' to 'U954 ff' or vice versa.

Fader #4: Target Index

Range: 001...128

Fader #4 defines the target index for the data import in the selected area (see below). In the example above it can be used to set the target index in the "Userwave to" area from 'U200 ff' to 'U299 ff'.

Note: Fader #5 and #6 have no function in this page.

Fader #7: Wavetable

Range: Nowhere, Origin, W065ff…W128ff

Fader #7 selects the wavetable area and defines the target. When selected, #4 will act on the wavetable area. If selected, a thick border highlights the "Wavetable to. Please note that in this case, Fader #3 is not active.

- *Nowhere:* The import will not affect the wavetables. Only user waves might be imported.
- *Origin* : The wavetables will be imported to the same position as in the original *.SET file.
- *W065ff…W128ff* : The wavetables will be imported to the defined position and its following positions. Please note that wavetables 001 to 064 are fixed wavetables and cannot be changed. E.g. defining 'W007 ff' will import the wavetables of the selected arrangements to W007, W008 etc..

Fader #8: User Wave

Range: Nowhere, Origin, U000ff…U999ff

Fader #8 selects the user wave area and defines the target. When selected, fader #3 and #4 will act on the user wave area. If selected, a thick border highlights the "Userwave to" area.

- *Nowhere:* The import will not affect the user waves of the wavetables. Only the wavetables might be imported.
- *Origin* : The user waves of the selected wavetable will be imported to the same position as in the original *.SET file.
- *U000ff…U999ff* : The user waves of the selected wavetables will be imported to the defined position and its following positions. Please note that fader #3 will change the hundreds of the target, U000, U100, U200 etc., and fader #4 will change the rest of the index, e.g. U300…U399. E.g. defining 'U456 ff' will import the user waves of the selected arrangements to U456, U457 etc..

Display Button #4: Select

Pressing "Select" will select the Wavetable at the current position and mark it with a little arrow. In the example below, WT068 and WT069 are selected.

Display Button #5: Remove

Pressing "Remove" will remove the Wavetable at the current position form the selection list and also remove the little arrow mark.

Display Button #7: Exit

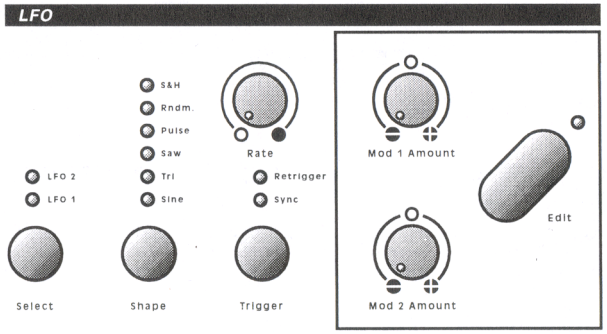
Pressing "Exit" or <Cancel> will exit the page without any import and display the import selection type page.

Display Button #8: Proceed

Pressing "Proceed" or <OK> will execute the import and to the import selection type page.

This chapter covers all functions associated with the use of modifier modules. These modules control the behaviour of the audio modules by *modifying* the parameters of the audio modules. However, they can also control each other, so one modifier module might modify another modifier module, which in turns act on an audio module.

LFOs *(bipolar)*



With OS 1.9 the Wave offers *three* LFOs, two common LFOs and a Step-LFO called Chopper. The Chopper is new with OS 1.9. It can be selected by pressing the [Select] button in the LFO section several times until both LEDs for LFO 1 and LFO 2 are on. Pressing [Select] again will select LFO 1.

This chapter first explains the Chopper and introduces the new MIDI synchronisation function. The original explanation of the other LFO functions and other modifiers start on page 3.1.

LFO 3 (Chopper)

The new Chopper creates stepped on-off patterns that can be used to chop the sound in various ways. To chop the sounds it offers up to 16 steps with on or off state, a modulation of the level and a modulation of the speed. The steps are cycled from left to right. If two neighbour steps are on, they are interpreted as one long step (no break in between). Additionally the Chopper offers various trigger and synchronisation modes.

[Select]

Range: LFO 1 / LFO 2 / Chopper

LFO 1 & 2 share the same interface (See page 3.1) The [Select] button allows to switch between the two LFOs and the Chopper; the corresponding LEDs indicate which LFO you currently are programming – when both LEDs are on, the Chopper is selected. The corresponding display page will also be switched when you choose to view the LFO parameters by pressing the [Edit] button in the LFO section.

[Shape]

Note: [Shape] has no function in Chopper mode. For LFO 1 & 2 see page 3.2.

[Trigger]

Range: off / Sync / Retrigger / Sync & Retrigger

In contrast to the standard LFO 1 & 2, Trigger offers *four* modes as to how the LFO will react when new keys are played.

- *off:* (no LED is lit) This mode leaves the LFO independent for each triggered voice. In this mode you will achieve independent chopping of your sound since

the Chopper of different voices will start at different steps. Use rate modulation to get an even more chaotic result.

- *Sync:* This mode synchronises the Choppers of all voices assigned to the instrument playing that sound. The sound will be chopped equal for all voices independently of when the key was pressed.

- *Retrigger:* This mode starts the Chopper at step one when a key is pressed. In this mode, the sound chops in the same rhythm for the voice whenever a key is pressed.

- *Sync & Retrigger:* (both LEDs are lit) This mode starts the Chopper at step one when a key is pressed and at the same time synchronises all the Choppers to the first key. In this mode, the sound chops equal for all voices but will be restarted with the first key pressed.

[Rate]

Range: 0...127

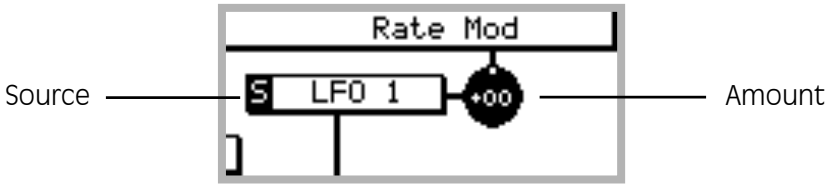
[Rate] sets the speed of the Chopper.

- *0* just selects the next step when ever a key is pressed. Maybe somewhat chaotic if you do not sync the choppers.

- *1* is the slowest speed of the Chopper – and I mean s------l------o------w ☺.

- *1*27 sets the highest possible rate; it produces more random chopping since the speed is rather fast.

[Rate Modulation Input]



Rate Modulation Input is a regular modulation input acting on the Chopper's [Rate]. Please note, that the Chopper now can be a modulation source too. Two parameters are available.

- **<Source>**

Range: modifier table

This parameter defines the source modifier of the Rate Modulation Input to alter the [Rate] parameter.

You can program this parameter using the respective display fader by pressing the [Edit] button located near the modulation amount knobs in the LFO section.

- **[Amount]**

Range: -64…+63

[Amount] sets the maximum possible amount of modulation for this Modulation input

Use the front panel knob [Rate Mod Amount] to adjust this parameter.

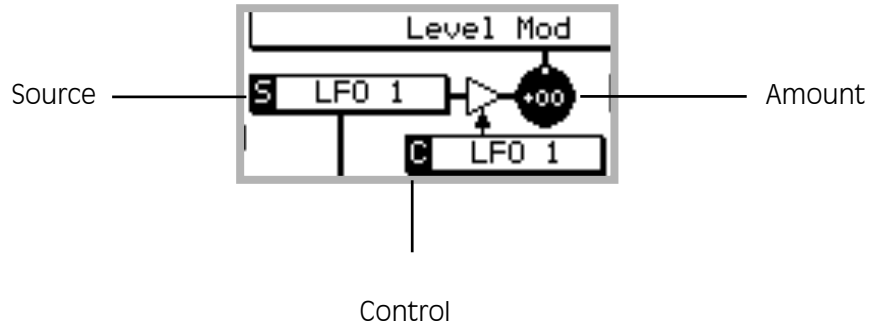
- *-64* inverts the source's output signal and applies the full modulation amount
- *+63* applies the source as programmed at the full modulation amount

All modulation values will be added to the actual value set by the [Rate] parameter. Therefore, a negative value will slow down the [Rate], whereas a positive value will speed it up.

Some possible applications:

- Use an Envelope to produce a speed change whenever a key is pressed.
- Use an LFO to produce slight speed changes that makes the chopping even more chaotic.
- Use the keyboard as a modulation source to set the chopper speed according to the note played.

[Level Modulation Input]



Level Modulation Input is a side chain modulation input that modulates the output level of the Chopper. Three parameters are available.

- **<Source>**

Range: modifier table

This parameter defines the source modifier of the Level Modulation Input to alter the Chopper output.

You can program this parameter using the respective display fader by pressing the [Edit] button located near the modulation amount knobs in the LFO section.

- **<Control>**

Range: modifier table

This parameter defines the control modifier used to scale the source modifier of the Level Modulation.

You can program this parameter using the respective display fader by pressing the [Edit] button located near the modulation amount knobs in the LFO section.

- **[Amount]**

Range: -64…+63

[Amount] sets the maximum possible amount of modulation for this Modulation input

Use the front panel knob [Level Mod Amount] to adjust this parameter.

- *-64* inverts the source's output signal and applies the full modulation amount
- *+63* applies the source as programmed at the full modulation amount

➪ The Amount parameter only determines the maximum possible modulation value; the actual value is set in real time by the control modifier. In any event, the actual amount of modulation will be determined by the control input:

- If the modifier connected to the control input is programmed to output its full amount, the source modifier will modulate the Chopper output level as set by the [Amount] parameter.
- If the control modifier outputs nothing, there will be no modulation of the output level.

Note: The output of the Chopper basically is either "0" or "1". With the level modulation it is possible to shape the Chopper's output

Some possible applications:

- Use an Envelope to produce chopped envelope curve – do not forget the retrigger function of the Chopper.

- Use a random generator (LFO) to create random amount of chopping.

<End Step>

Range: 1…16

This parameter is set by use of the corresponding fader below the display. It sets the length of pattern the Chopper produces.

- Ok, Step *1* does not really make sense but it might help during sound creation to mute bypass the chopper.

- *16* sets the chopper length to 16 steps.

Note: When synchronised to an external device (LFO, MIDI), to change the end step also leads to a speed change of the Chopper because the synchronisation remains the same.

<Ext Sync>

Range: off, MIDI Sync, MIDI Beat, LFO 1, LFO2

This parameter is set by use of the corresponding fader below the display. It defines the external synchronisation. The Chopper can be synchronised either to MIDI or an LFO. Please note that it is possible to synchronise all three LFOs. This can be done by synchronising the Chopper and e.g. LFO 2 to LFO 1.

- *off:* When set to "off", the Chopper is not synchronised to an external device.

- *MIDI Sync:* This mode synchronises the Choppers to the MIDI clock information. Please note that there are a couple of remarks you have to consider of:
  - Use the [Rate] to set a divider to the MIDI clock. The divider allows you to speed up / down the Chopper in reference to the MIDI clock. See corresponding table below.
    Note: the [Rate] even can be modulated by a source in MIDI Sync mode – well is it then really synchronised?
  - A MIDI Start or MIDI Continue command will reset the MIDI Chopper to its start position

- Sync and Retrigger mode also work in MIDI Sync mode. When Retrigger is set, the Chopper will be reset with each key pressed. When Sync is set, all Choppers of the voice are synchronised.

- *MIDI Beat:* This mode synchronises the Choppers to the MIDI clock information. Additionally the Chopper will be reset every beat. This allows having a certain MIDI synchronisation even with rate modulation. The remarks are the same as for MIDI Sync.
  Note: Please note that for reset of the Chopper the modulation of the rate is not considered.

- *LFO1, LFO2:* The chopper is synched to the speed LFO 1, LFO 2 respectively. In this mode, it will have the same speed as the LFO. Of course the phase will be different, but sync and retrigger mode can be used as well.
  Again it is possible to use the [Rate] to set a divider/multiplier and again it is possible to modulate the rate by a source – incredible the possibilities ☺

Note: Please note that the dividers and multipliers for LFO synchronisation are not the same as for MIDI synchronisation. The idea behind this behaviour is that MIDI synchronisation is thought to be oriented at beats or bars, a musical approach. LFO synchronisation is meant to be a sound sculpting tool and so synchronisation is simpler.

The following shows the multiplier/divider table MIDI Sync.

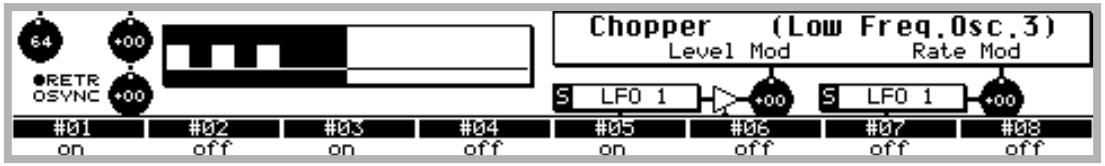
From rate...	... to rate	Divider /Multiplier	# Beats for reset (Bars for 4/4 beat)
0	*3*	/32	32 (8 bars)
4	*7*	/28	28 (7 bars)
8	*11*	/24	24 (6 bars)
12	*15*	/21	21 (5 ¼ bars)
16	*19*	/16	16 (4 bars)
20	*27*	/14	14 (3.5 bars)
28	*35*	/12	12 (3 bars)
36	*43*	/8	08 (2 bars)
44	*49*	/7	07 (1 ¾ bars)
52	*59*	/6	06 (1 ½ bars)
60	*67*	/4	04 (1 bar)
68	*75*	/3	03 (¾ bar)
76	*83*	/2	02 (½ bar)
84	*91*	x 1	01 (¼ bar)
92	*99*	x 4/3	¾ beat (3/16 bar)
100	*107*	x 3/2	2/3 beat (1/6 bar)
108	*111*	x 2	½ beat (1/8 bar)
112	*115*	x 3	1/3 beat (1/12 bar)
116	*119*	x 4	¼ beat (1/16 bar)
120	*123*	x 6	1/6 beat (1/24 bar)
124	*127*	x 8	1/8 beat (1/32 bar)

The following shows the multiplier/divider table LFO Sync.

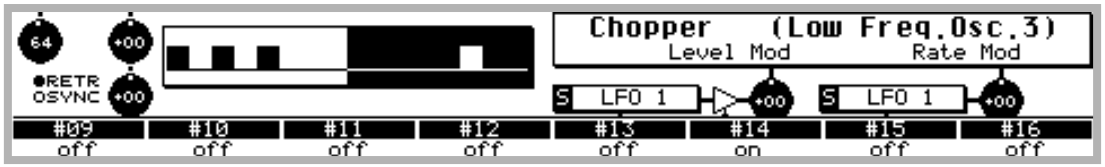
From rate...	... to rate	LFO Divider /Multiplier
0	*13*	/16
14	*27*	/8
28	*41*	/4
42	*55*	/2
56	*69*	x1
70	*83*	x2
84	*97*	x4
98	*111*	x8
112	*127*	x16

[Page ▶], [Page ◀]

The Page buttons switch to the step entry pages. There are two entry pages which allow to enter 8 steps each.



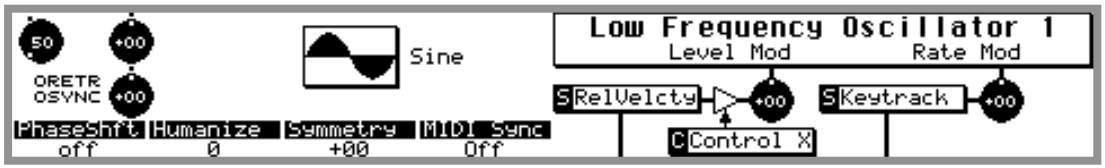
You can set the step to "on" or "off" of step #1 to #8 by using the respective display fader. Then use the [Page ▶], button to enter step #9 to #16



In the example above step #14 was set to "on" after switching to step entry #9-#16.

LFO - MIDI Sync

Entering the LFO page shows two additional parameters for LFO 1 and one additional parameter for LFO 2. LFO 1 now has a phase shift parameter, which will work with MIDI sync and the retrigger function (see below). The phase shift parameter for the retrigger functionality also is added to the LFO 2. And now both of the LFOs offer MIDI synchronisation, controlled by slider #4. MIDI synchronisation individually is available for both LFOs. But either dependence on the phase shift parameter might cause both to influence each other, nevertheless. Therefore the functionality of these two new parameters makes the LFOs rather complex.



All parameters except "PhaseShft" and "MIDI Sync" correspond to the former parameters of the Wave and will not repeated here. So the explanations concentrate on the new parameters.

<PhaseShft>

Range: off / 002…360

Phase Shift shifts the phase of the LFO for the entered amount of degrees. If the function is set to *off*, no phase lock will occur. The function depends on the settings of "Retrigger" and "MIDI sync" The following Table will give an explanation of the behaviour of the function depending on the settings of the functions mentioned before. (Please note that the description of "MIDI-Sync" and "MIDI-Beat-Sync" will follow below.)

Trigger	MIDI Sync	Description	Remarks
Retrig	*off*	The start phase of the LFO wave is adjusted with the PhaseShft. Therefore the sawtooth can start with the lowest value by each key. In former versions it always started with the zero point.	LFO 1 & 2
Retrig	*MIDI-Sync*	The start phase of the LFO is synchronised with the MIDI clock according to the description above. E.g. a sawtooth will start with the lowest value synchronised to MIDI	LFO 1 & 2
Retrig	*MIDI-Beat*	The start phase of the LFO will be synchronised with the bar according to the description above. E.g. a sawtooth will start with the lowest value at each beat.	LFO 1 & 2
no Trig.	*off*	LFO 2 is synchronised with LFO 1 but has a phase shifting according to the settings.	Only LFO 2 (LFO 1 will ignore the setting)
no Trig.	*MIDI-Sync, MIDI-Beat*	The phase shift has no functionality since MIDI trigger has higher priority.	LFO 1 & 2
Sync	*off*	LFO 2 will be synchronised with LFO 1 and all LFOs of the different voices are synchronised.	Only LFO 2 (LFO 1 will ignore the setting)
Sync	*MIDI-Sync, MIDI-Beat*	The phase shift has no functionality since the MIDI trigger has higher priority.	LFO 1 & 2

The following is the priority of the settings of the two parameters:

- 1st Priority: MIDI-Sync
- 2nd Priority: Retrig
- 3rd Priority: Synch LFO2 to LFO 1

In other words, e.g. LFO 2 only is synchronised to LFO 1, if no retrigger is set to LFO 2 and LFO 2 is not synchronised to MIDI.

Remark: If LFO 2 is not set to "retrig" and has no MIDI synchronisation, but a phase shift is set, then it is synchronised to LFO1. If in this case LFO 1 is synchronised to MIDI, LFO 2 automatically is synchronised to MIDI too. As mentioned above, this is a rather complex situation.

<MIDI Sync>

Range: off / MIDI Sync / MIDI Beat

This function allows a synchronisation of the LFO to external MIDI clock signals.

- *MIDI Sync:* This function synchronises the LFO to the MIDI clock. When active, the *Rate* value will have a new function because it will divide or multiply the LFO speed according to the MIDI clock (see table below).
- *MIDI Beat:* This function also synchronises the LFO to the MIDI clock but will synchronise it to a single beat (1 quarter of a bar). Depending on the start commands of the attached sequencer, the LFO will synchronise to the beats.

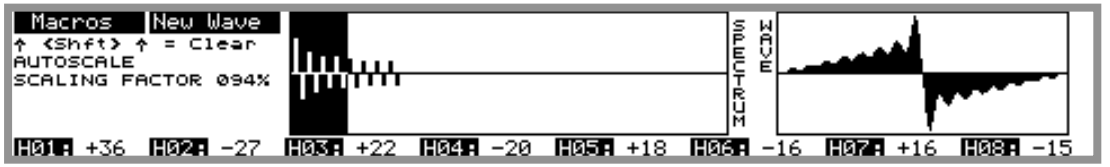
Please note, that the trigger functions "sync" and "retrig" also are available in this mode. Please also note that having MIDI sync set to *MIDI Beat* and trigger is set to "retrig" it might seem that all LFOs of all voices are synchronised. But having a big divider setting (see table below) will show that in fact they are not synchronised. E.g. with such settings you might get effects where the LFO of voice #2 has a phase shift of 180° to voice #1. As mentioned above, the LFOs became rather complex.

When synchronised to MIDI, the LFO rate function changed. It will act as a multiplier or divider of the frequency of the MIDI clock. The following table gives an overview of the settings:

From rate...	... to rate	Divider /Multiplier
0	*0*	/ 9
1	*8*	/ 8
9	*16*	/ 7
17	*24*	/ 6
25	*32*	/ 5
33	*40*	/ 4
41	*48*	/ 3
49	*56*	/ 2
57	*64*	/ 1 = x 1
65	*72*	/ 1 = x 1
73	*80*	x 2
81	*88*	x 3
89	*96*	x 4
97	*104*	x 5
104	*112*	x 6
113	*120*	x 7
121	*127*	x 8

To start from scratch, the best way is to clear all harmonics. Currently it is achieved by selecting the macro "Scale Wave..." from the menu "Macros", set the range to 0% and press <ok>. Or the macro "Delete Harmonics..." has to be selected and the threshold has to be set to 100%.

Now there is an easier way. OS 1.8 implements a "silence function" that can be invoked by simply pressing <Shift> at the same time as you press the button <Disp1>, which is the button above the menu "Macros". The result is an empty wave with all harmonics set to zero. To indicate this function, there is an extra line added to the screen, reading
"↑ <Shft> ↑ = Clear" in the first line below the menus.



Wave Analysis

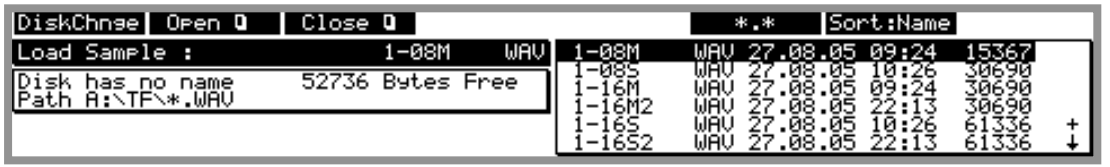
Additional to the former Steinberg Avalon and sound designer I format (see p. 4.7 in Wavetable Design) the Wave now is able to read WAV formatted files. A couple of remarks:

- Only .WAV files without data compression can be analysed.
- Only .WAV files with a resolution of a multiple of 8 bit can be analysed (8 bit, 16 bit, 24 bit, 32 bit, ...)
- Only .WAV files up to a size of 640kB can be analysed. This is a limitation of the physical memory of the Wave.
- If more than one channel is stored in the .WAV file, only the first channel will be analysed (e.g. left channel for stereo samples).
- If the resolution is more than 16 bit, only the two most significant bytes of the samples (most significant 16 bits) will be analysed. The lower significant bytes will be ignored.

Please note that the sample format is recognised based on the file extension of the file to be analysed.

- *.WAV indicate a WAV file.
- *.SD indicate a sound designer I file.
- *.SMP indicate an Avalon file.

To allow the .WAV file, the file selection had to be slightly changed. When choosing a file for analysis (e.g. by time mode), the file selection first displays .WAV files.



To load *.SD or *.SMP files, the user has to press <*.*> which will show all files in the directory. Then the desired *.SD or *.SMP file can be selected. *Remark:* The Wave will not be able to analyse any *.XYZ file except the defined three types.

Please also note that, after selecting a .WAV file for analysis with a resolution of 16 bits or higher, you will be prompted to select an 8 bit or a 16 bit analysis. The Wave will show an alert box containing the following information:

Wave 16 bit analysis
analyze 16 bit (ok) or
reduce to 8 bit (cancel) ?
CANCEL / OK

Pressing <OK> will perform a 16 bit analysis and <CANCEL> will perform an 8 bit analysis. While the 8 bit analysis will add some high frequencies to the result, which might be helpful in noisy samples, the 16 bit analysis might produce a smoother wave table which might be desirable for harmonic samples. Just try the different options.