digitalXtension

microWAVE PC

Installation, Introduction and MIDI-implementation

English

CE declaration

We:

TerraTec Electronic GmbH · Herrenpfad 38 · D-41334 Nettetal

hereby declare that the product:

digitalXtension microWAVE PC

to which this declaration refers is in compliance with the following standards or standardizing documents:

1. EN 55022

2. EN 50082-1

The following are the stipulated operating conditions and environmental conditions for said compliance:

Residential, business and commercial environments and small-company environments.

This declaration is based on:

Test report(s) of the EMC testing laboratory

IMPORTANT NOTE.

The concept, which is behind the microWAVE PC, is completely new. Please read, even when you've sworn never to read a manual again, at least the chapter Quickstart and First steps. This chapter is specially created for those who can't wait and want to start making music right away. It's fun, we assure you! **Thanks!**

Another important note for the use of the EWS-Digital-Interface.

To be able to make an Audio recording using the Digital-Interface of the EWS64 you **have to** to make sure that the microWAVE PC is initialised and it's routing is set to "Recording". Otherwise the supplied digital signal (e.g. DAT or Minidisk) would not be routed to the card. The microEd!t-software can be configured to automatically initialise after booting up your system. Next to that, the software "remembers" the last routing that was made and sends this information automatically to the microWAVE PC operating system after you've started the program. So, you only have to start the software ones to activate the Digital Input. Same for the two Digital Outputs.

Note for EWS64 L users:

If you have a MIDI keyboard connected to the GAME-port of the EWS64, you'll now need to use the new MIDI I/O's of the microWAVE PC frontmodule (with a standard MIDI cable). It is not longer possible to use the MIDI/GAME port at the backside of your card. Also, the switch "MIDI ROUTING" in your EWS ControlPanel has no function anymore.

PROLOGUE.

We'd like to congratulate you with your decision to use as well the microWAVE PC as the Audiosystem EWS64 as a productive- and creative tool. With this combination of hard- and software you've obtained one of the most powerful Music-systems for PC - which you probably already know, otherwise you wouldn't be holding this manual right now. But to make a long story short: We wish you lots of fun and of course good sounds with your new product,

... your TerraTec Team!

microWAVE PC is a project of the companies TerraTec Electronic GmbH and Waldorf Electronics GmbH. The development started when the two teams coincidentally met and started chatting about their visions of the future of music PC's. For the great, uncomplicated way of working together we may only thank each other:

Walter Ahrend, Uli Gobbers, Uwe Zänker, Frank Gräber, Heiko Meertz, Kurt Fischer and Oliver Hutz from TerraTec.

Stefan Stenzel, Wolfram Franke, Thomas Kircher and Wolfgang Düren from Waldorf.

The software programmers D-lusion, especially Thomas Holl for his programming tricks again and again.

Hans-Georg Nowak from Schlafhorst for the black paint and Axel Hartmann from design-Box for the blue paint. :-)

and last but not least Ivan Willems for the english manual.

CONTENTS

The microWAVE PC package should contain:

1 x 5¼" Frontpanel „microWAVE PC"

1 x wide flatcable for digital connection

1 x coloured flatcable for analogue connection

4 x small screws for tightening panel in 5¼" shaft

1 x this manual for installation, introduction and MIDI-implementation

1 x manual with tips for the synthesizer-parameters

2 x floppy disc with software for the microWAVE PC

1 x CD-ROM with drivers and software for the EWS64 L/XL

1 x registration card

SYSTEM REQUIREMENTS.

- Audiosystem EWS64 L or XL with driver-version 2.16 (and firmware 2.11) or higher. A computer with a Pentium -Processor or faster, Windows 95 or 98.
- Your graphic-card should at least be able to operate in a 800x600 at 265 colours modus.
- A good monitor-system like active speakers or a headphone.

PREFERABLE ACCESSORIES.

- MIDI-sequencer software (e.g. Cubasis AV, supplied with you EWS64).
- Midi master keyboard with touch-sensitivity and controller-features (e.g. TerraTec Midi Master Pro).

QUICKSTART.

(I KNOW MY EWS64 L/XL AND MY SYSTEM - LET'S GO!).

Convince yourself, that your EWS64L/XL with driver-version 2.16 or higher is running smoothly under Windows 95/98. In any case you must install the drivers on the CD-ROM that was supplied with your microWAVE PC.
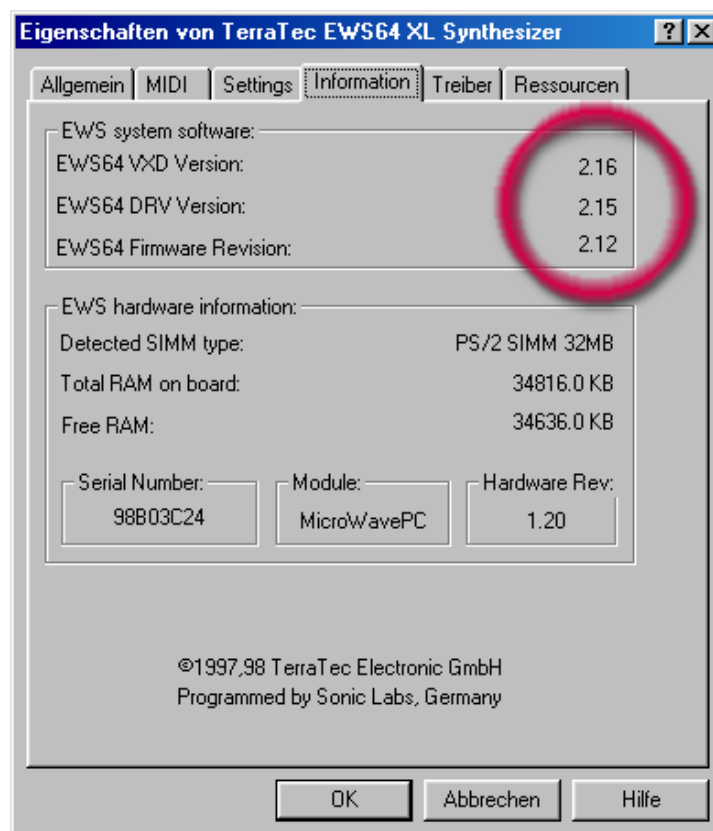
Picture 1: Make sure that your EWS64 is running on driver-version 2.16.

Important note: The microWAVE PC will communicate through one of the two midi-interfaces of the EWS64. As a default this is MIDI-1. In case you would like to change this default-setting to MIDI-2 you have to change the (only) jumper on the board of the microWAVE PC. Of course MIDI-2 should be activated under Windows which is no default setting. How to activate MIDI-2 under Windows, can be found in the EWS64 L/XL Software-manual.

This also the time to check if the Headphones connector is still attached to the board. If you have a Wavetable-daughterboard you can now install it on the 26 pins connector on the microWAVE PC board.

Now, carefully open the housing of your PC after disconnecting the power supply cord and connect the microWAVE PC with the supplied flatcables to the EWS64 board. Note: It's not possible to use the silver Frontpanel next to the microWAVE PC.

Boot up your PC and check if the microWAVE PC is recognised in the Device Manager without any problems.
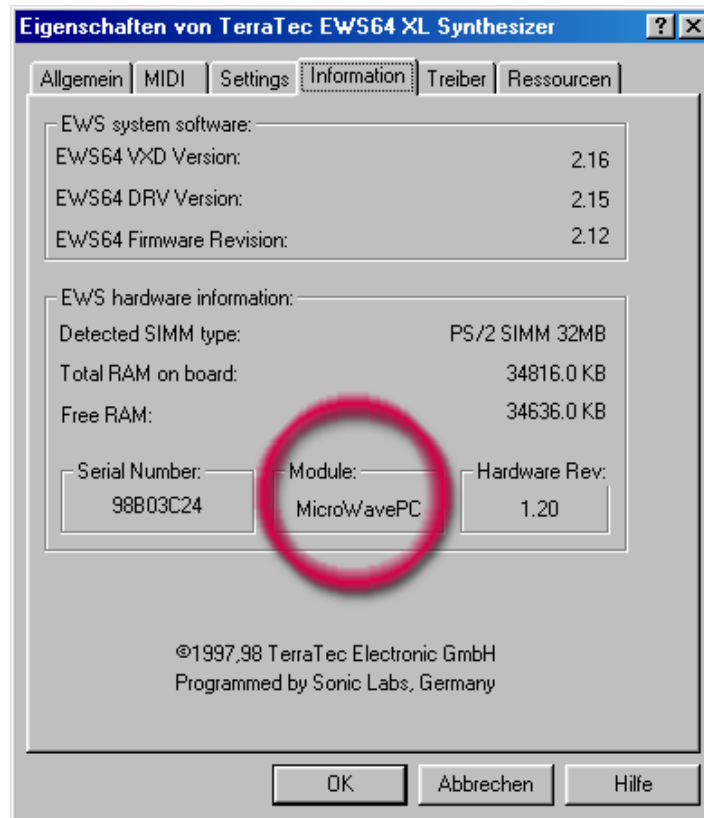
Picture 2: The microWAVE PC is being recognised as a module

Install the microEd!t-software from the supplied floppy disk.

Now set the Input Selector to "D" and slide the In-2 fader completely up.

You can also use the supplied Mixer-setting "`microWAVE PC.ttm`" which you can find in the microEd!t-directory.
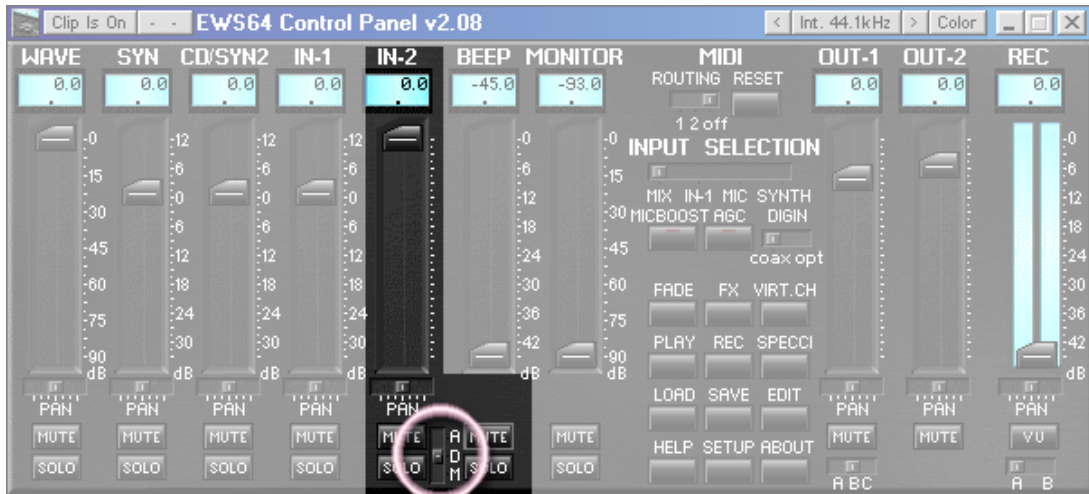
<div align="center">Picture 3: In-2 must be configured correctly.</div>

Start up microEd!t. This program will initialize the microWAVE PC and upload a Soundset (`default.mws`).

Press the Spacebar on your PC-keyboard. You should now hear a tone - this means that you've installed your microWAVE PC correctly.

ASSEMBLY-INSTRUCTION.

INSTALLATION AND THE FIRST TONE.

We assume that that you've already correctly installed your Audiosystem EWS64 L/XL in your PC. More information to assembling and installing the EWS64 board in your EWS64 Hardware manual. We must also assume that you feel comfortable with the EWS64 basics and handling. Meaning that you know how to operate the EWS64 Control Panel, FX-Panel and that you are familiar with the MIDI-basics. (More information to this subject is to be found in the MIDI- and Wavetable Manual of the EWS64).

Please be sure you have your EWS64 L/XL, running driver-version 2.16 or higher, installed properly under Windows 95/98. You can check this by clicking the right mouse-button on the "My Computer" -icon on your desktop and choose for *Properties*. In the *Device Manager* click on *TerraTec Audio Devices*. Now open *TerraTec EWS64 XL Synthesizer* and check `.DRV` and `.VXD` for its version-number under *Information*.

If these positions don't show version-number 2.16, please install the new drivers which are to be found on the supplied CD-ROM. On this CD-ROM you'll find an Update-program (remove64.exe) which updates as well the drivers as the software of the EWS64.
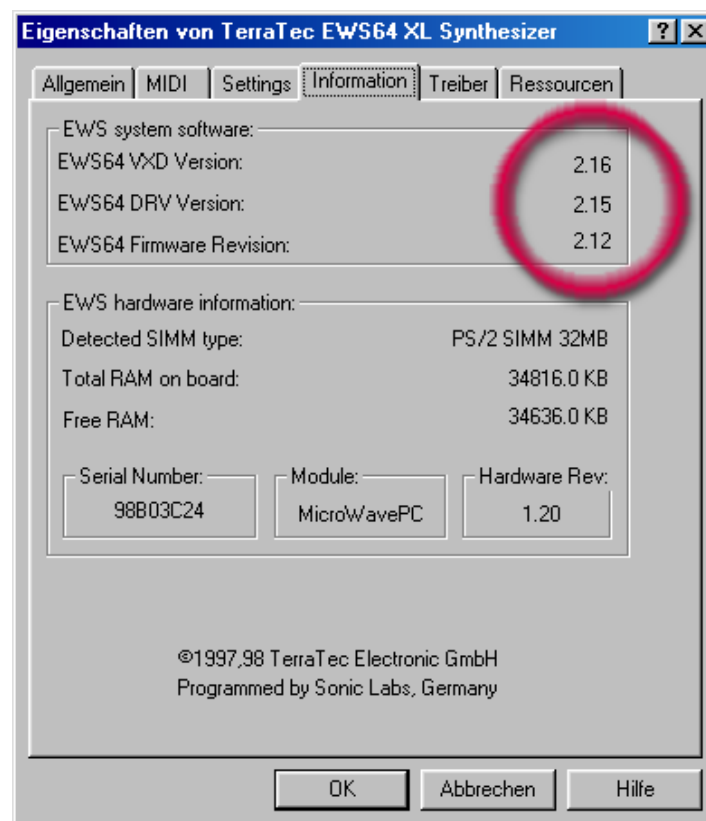
Picture 4: Make sure that your EWS64 is running on driver-version 2.16.

Before assembling the microWAVE PC in your PC, please be sure to disconnect the Power Supply Cord from your computer. Now, open up the housing to reach the 5¼" shaft. Be careful 'cause many housings have sharp edges on their inside frame which can cause nasty cuts.

If you already have installed an EWS64 XL than remove the silver front-panel. This panel can not be used next to the microWAVE PC - which based upon the same connections of the microWAVE PC, isn't necessary.

In case you don't have an EWS64 L/XL installed, you should first install it before installing the microWAVE PC. Instructions to this subject are to be found in the EWS64 Hardware-manual which is supplied with your Audiosystem EWS64 L/XL.

Important note: The microWAVE PC will communicate through one of the two MIDI-interfaces of the EWS64. As a default this is MIDI-1. In case you would like to change this default-setting to MIDI-2 you have to change the (only) jumper on the board of the microWAVE PC. Of course MIDI-2 should be activated under Windows which is no default setting. How to activate MIDI-2 under Windows, can be found in the EWS64 L/XL Software-manual.

This also the time to check if the Headphones connector is still attached to the board. If have a Wavetable-daughterboard you can now install it on the 26 pins connector on the microWAVE PC board.

Now, connect your new frontpanel with the supplied flatcables. Due to the special connector-shape it's impossible to make a wrong connection without using force. Tighten the screws that fix the microWAVE 's position in the 5,25" shaft. Tip: Try to use a position below your CD-ROM or CD-Burner unit to avoid other cables to be in the way.

Boot up your PC with Windows 95/98 and than check if the "Device Manager" recognized the microWAVE PC without any problems. If you do not see "microWAVE PC" in the list, please turn off your PC and check the flatcable-connections again. Up to now, there's no case known in which the microWAVE PC was not recognized by the Drivers- Except for a hardware-failture
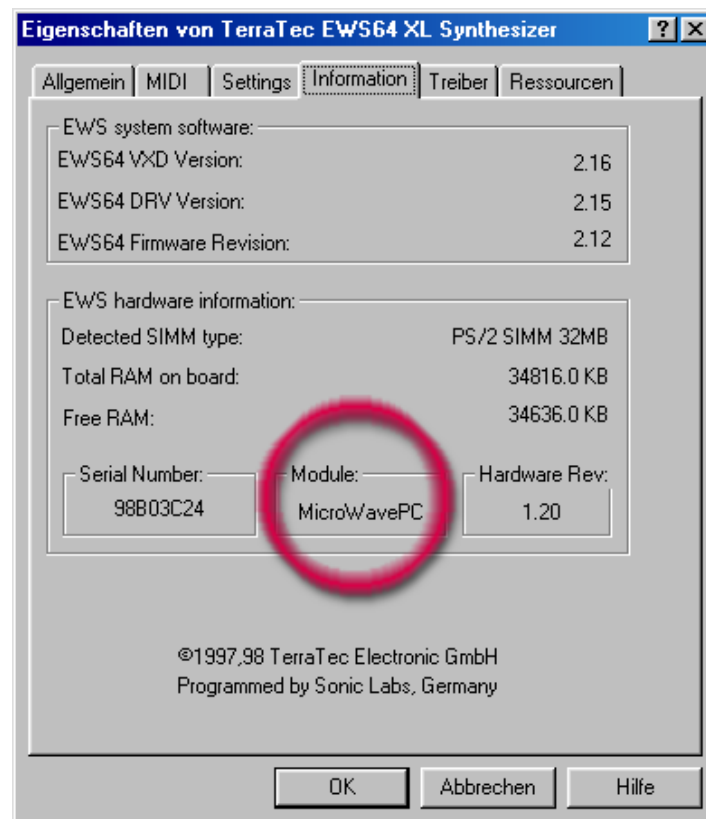
Picture 5: .The microWAVE PC is being recognized as a modulet.

Next install the microEd!t-software which is to be found on the supplied floppy disk. Insert the disk in drive `A:` and run the Setup-program (Click *Start* and select *Run*, type `a:\setup`). The software leads you trough a brief installation procedure.

Before starting the microEd!t program, set the Input-selector in the EWS64 Control-panel to *D* for digital and slide the *IN-2* fader completely up. You can also use the supplied Mixer-setting (`microWAVE PC.ttm`). Be sure to save your own Mixer-setting if desired, before activating microWAVE PC.mix.
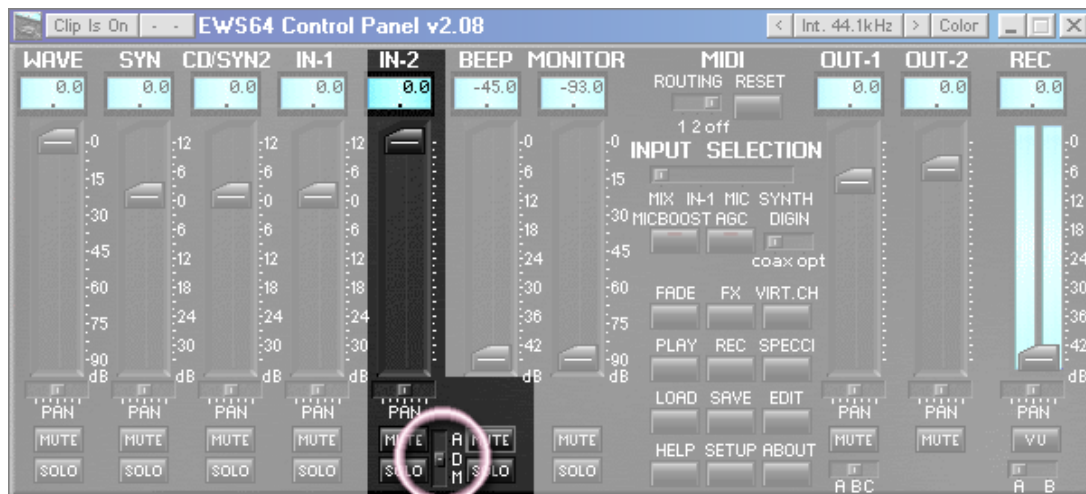
Picture 6: In-2 must be configured correctly.

Now start microEd!t from the new Program-group. This program will initialize the microWAVE PC and upload a Soundset (default.mws).

Information to the microWAVE PC-Concept: The operating-system, the sounds and Wave-tables of the microWAVE PC are saved in its own RAM. The RAM is being emptied when you shut your PC down. Therefore the microWAVE PC must be initialized before every operation - this is being done by the installed software and can be set to initialize automatically in a few seconds when the program is started (more information to this subject is to be found further ahead in this manual.).

Press the Spacebar on your PC-keyboard, you should now hear a tone - This means that you've installed your microWAVE PC correctly. If you don't hear anything, please check the above mentioned Control-panel settings again.

THE FIRST STEPS.

THE CONCEPT AND SOFTWARE-HANDLING.

To be able to use the full opportunities of your new microWAVE PC, it is wise to work trough this chapter in which the concept of this synthesizer and the handling of the microEd!t-software is explained. Especially for operating the microWAVE PC together with all the EWS64 features, this chapter is of highest importance.

WHAT EXACTLY IS THIS GADGET I BOUGHT?

The microWAVE PC is actually nothing else than an external Sound-module (like e.g. its *big brother* microWAVE II and microWAVE XT). It uses its own (independent from Host-CPU or EWS64) Synthesis and has connections as well for MIDI as for Audio. For a *display* it uses your PC monitor-screen and it can be operated by the PC-Mouse and PC-keyboard instead of using Hardware-buttons/knobs (which is also possible, but more about this subject later on in this manual).

Actually the real outstanding features is in the combination of the microWAVE PC and the Audiosystem EWS64. The possibilities of the combination show us the exceptional concept and the advantages of this solution in opposite to a conventional solution such as an external synthesizer-module:

• The microWAVE PC uses the Analogue and Digital Outputs of the EWS64.

• The microWAVE PC uses the Digital Input of the EWS64.

• The microWAVE PC uses the EWS64 Effects-processor.

• The microWAVE PC uses the MIDI-interfaces of the EWS64.

• The microWAVE PC uses your PC only for saving Sounds, not for playing them!

• And: the microWAVE PC allows you to record its Output-signal on a digital equal level through the EWS64.

To be able to work with the microWAVE PC an Audiosystem EWS64 and its software is needed. Let's have a look on the connections between the both devices using the following chart. (No fear, it won't get that complicated!):
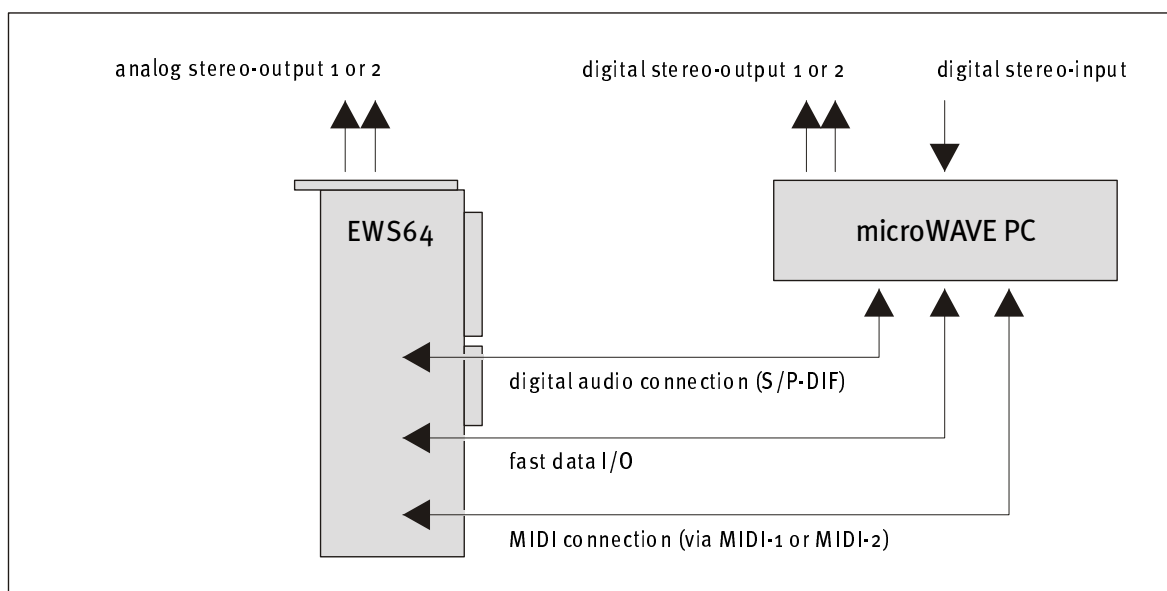
Picture 7: The connection between the microWAVE PC and the EWS64.

As you see, the microWAVE PC is connected to the digital Input of the EWS64. This gives us the advantage of an Audio-transmission with no losses at all. On top of this, the signal is directly available for editing with the EWS64. The Output of this signal is available over the two Analogue Outputs of the EWS64. Next to this the Output-signal is always available over the Digital Output-1 on the microWAVE PC front-panel.

🚓   **NOTE:** According to the principle, it's not possible to route Analogue Input-signals through the EWS64 DSP. This is also the case for the Output-signal of a connected Daughterboard (It uses the EWS64's Codec) which can not be heard simultaneously with the microWAVE PC.

To be able to hear anything at all, the Input-selector in the EWS64 Control-panel should be switched to "D" and the In-2 fader should be in the upper slide-position. The signal of the microWAVE PC is now routed to the EWS64 digital Input. (For the Guru's among us: There's also the possibility to make a connection in the opposite direction, meaning that the microWAVE PC cannot only receive Audio-signals from the EWS64, but can also be held in "SYNC" by the EWS64-board. So in this case the microWAVE PC is in a "Slave-Modus" on a digital level.

Start up the supplied software microEd!t. You can now see how the microWAVE PC is being initialized by its software and that its Sounds are being uploaded. This initializing and uploading is being done over a special data-stream, which exists additional to the Audio- and MIDI connections and is necessary every time the microWAVE PC has been shut down. It's also this connection which is responsible for the MIDI-data transmission. More about this special data-stream is to be read later in this manual.

Now, press the Spacebar on your PC-keyboard. You should hear a sound (Note C3), which will be shown in the display. Switch to another Instrument in microWAVE PC. Here for you should press the "Arrow-Up" key or turn "The big wheel" with the Mouse. You can now see how the display-information changes. Press the Spacebar again, to play the newly selected Sound. Cool or what?
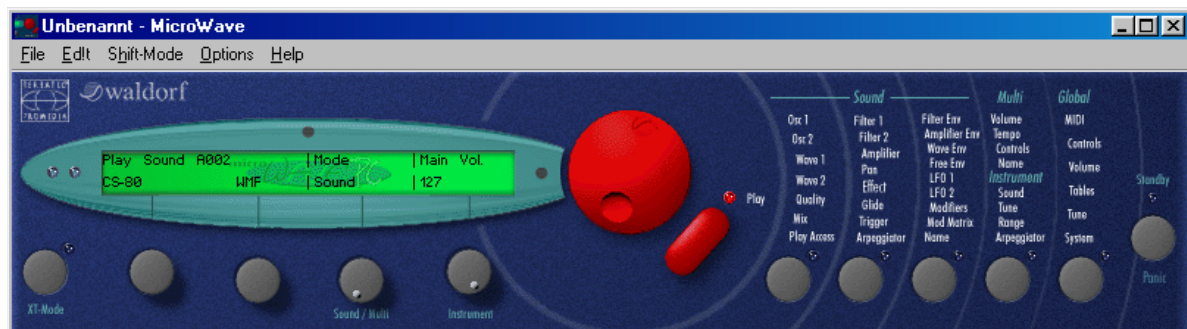
Picture 8: The first sound with the microWAVE PC.

(If you don't have a MIDI-keyboard, you can skip the following paragraph)
Best would be though, to use a MIDI-keyboard to play the instruments. To set up the MIDI parameters, open the "Options" menu and select "Preferences" (Or use the key-combination Ctrl+P). Now choose a MIDI-Input. If you have installed only one EWS64 and no additional MIDI-interfaces, than your MIDI-keyboard signal will probably be handled by the "EWS64 Midi-Record" or "EWS64 XL Midi-2"- driver. Acknowledge with "OK" and play on your connected MIDI-keyboard. Even cooler or what? (By the way: Incoming MIDI-signals will be shown by the blinking LED next to the display.)

To get an overview of all available sounds of the microWAVE PC, eyeball the "Library"-function of the microEd!t software. You can choose this function from the "Options"-menu or by pressing the key-combination Ctrl+L. On the right side of the overview you'll find all the sounds available in the device's memory. Click an Instrument to play it.

The microWAVE PC can operate in two different modes: the SOUND-mode which we've been using up to now and the MULTI-mode. The MULTI-mode offers up to 8 instruments simultaneously on one or more MIDI-channels.

Now switch to MULTI-mode. You don't have to leave the "Library"-window for it. Press "M" or turn the "SOUND/MULTI"-button, which you can find under the display, with the Mouse. As a third option you can also click directly on "SOUND" in the display: click ones and you change the mode. As you see, also the view on the "Library" changes and shows the available MULTI's.

A great feature of this "MULTI"-mode is the possibility to assign different Appergiator-settings to the different sounds to generate very complex build sounds - which you should try for at least ones.
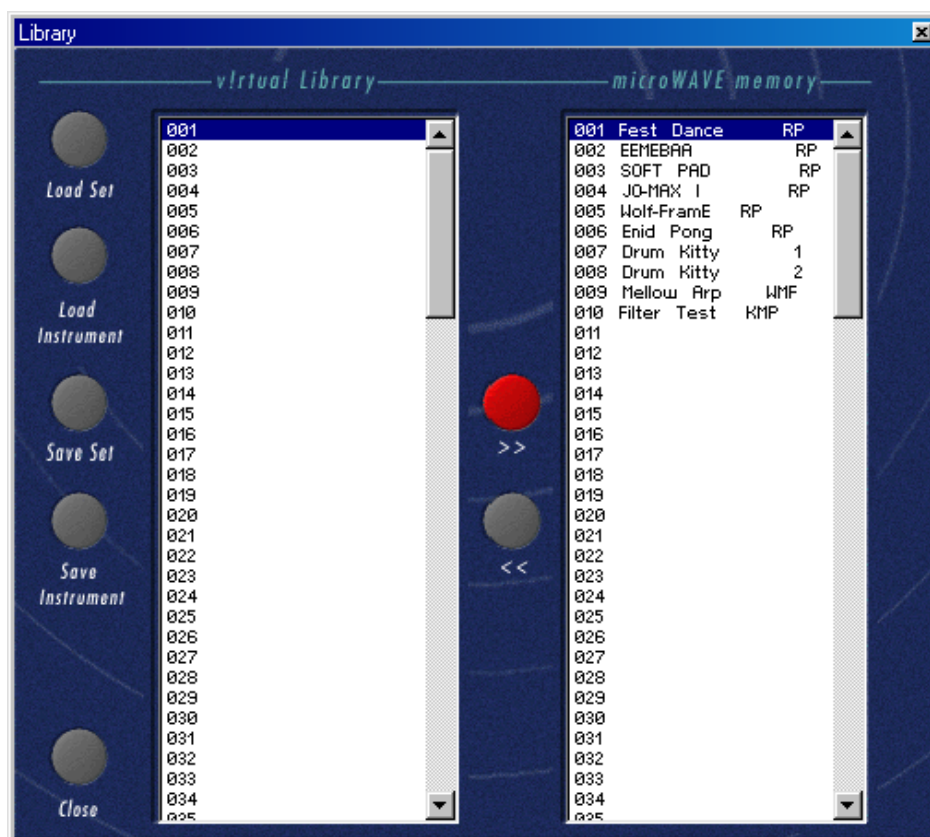
Picture 9: The Library in MULTI-mode.

That was the first Sound-impression so far. Leave the Library by pressing the "OK" button and switch back to "SOUND"-mode.

Now we get to the "really cool stuff", the Sound-synthesis. 'Cause what would a synthesizer be without any of the numerous Editing-possibilities. We suggest you to just try this yourself on the spot and hear what happens. Before you do so, you better switch to a more convenient view for Sound-editing - the XT-mode. To enter this mode press the "X"-key on your PC-keyboard or the most left button.
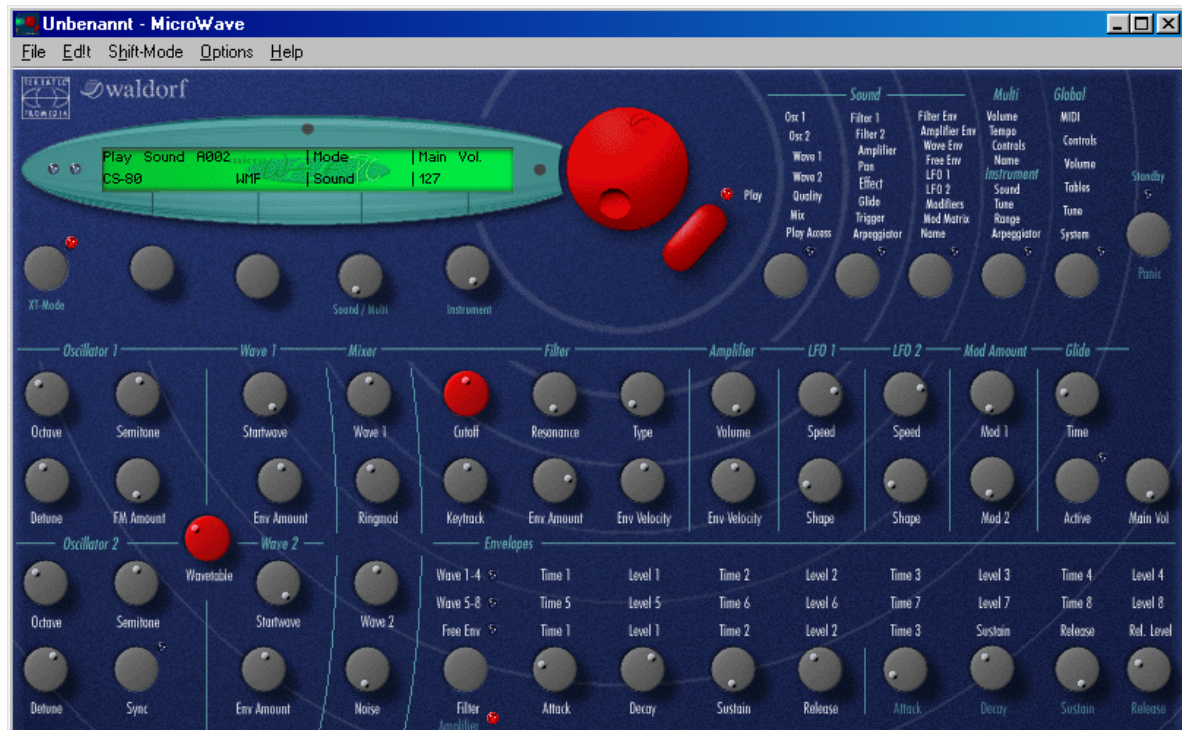
Picture 10: The XT-mode - Editing sounds in one overview.

Wow! That's how it looks - The appearance and operation of the user-interface is identical to the microWAVE XT. Turn the knobs, press the buttons and play on your keyboard (or Spacebar) at the same time.

In case you never experienced working with Synthesizers before, it might be useful to give the following parameters some extra attention:

- The Red Wavetable-knob - Simply said: This selects the different Wavetables of the microWAVE PC.

- The Red Filter-knob and his neighbour Resonance - this is where you play with different Filter-effects and where you really start changing the character of the Sound.

- The 4 knobs for Volume-Attack on the right down.

- The knob "FM-Amount" for very severe Sound-changes.

During knob-operation you can see the applicable value changing in the upper right of the display and disappears again after a pre-set period of time. The basic appearance will always be the last page that was chosen. If you hold the "Shift"-key while turning the knob, the appearance will change to the page related to the parameter - very useful to get an instant overview on the related values.

This much about the operation of the Synthesis. A complete introduction to Sound-synthesis of the microWAVE PC can be found in the second manual for Sound-programmers.

Now you've learned the basic way of operating the microEd!t software. In the next chapter we'll discuss more functions, like routing and basic settings, loading and saving sounds as well as the interaction with other MIDI-programs. All functions of the microWAVE PC (like the real hardware-functions e.g. global settings like MIDI-channel and display appearance or sending MIDI-dumps) will be explained in the second manual.

We'd like to take the opportunity to thank you for sticking with us during this brief introduction and we wish you lot's of fun with the microWAVE PC.

THE FUNCTIONS OF MICROED!T

PREFERENCES

To change the preferences of the program you have to enter the "Options"-menu and select "Preferences" or press the key-combination "Ctrl+P". In this window you can choose the MIDI-In and Outputs.

Picture 11: The Preferences - setting up MIDI I/O and initializing.

MIDI-OUTPUT.

This is where you select if MIDI-data is to be send and which driver will be used. For the direct and simple use of the microWAVE PC it's **not** needed to select a specific driver, because this transfer is being handled by its own interface. Therefor the default setting is "No MIDI Output".

In case you want to record button/knob-actions in other MIDI-applications you'll have to select an Output-driver. Usually one of the EWS64 Virtual-MIDI-drivers is to be selected, which are designed to handle multiple MIDI-applications.

More information to this subject is to be found in the chapter "Communication with other MIDI-applications"

MIDI-INPUT.

This is where you select if MIDI-data is to be received and which driver will be used. If you have connected a MIDI-keyboard to the first MIDI-Input, then "TerraTec MIDI Record" should be selected.

AUTO-UPLOAD FIRMWARE IF MICROWAVE PC ISN'T INITIALIZED.

As we've seen, the microWAVE PC has to be initialized before use.
Therefor the Operating System - the Firmware - needs to be uploaded to the module. This procedure can be done automatically during the start-up of the program. If you deactivate this setting, the microWAVE PC must be initialized manually. This is done in the "Ed!t"-Menu by selecting "Initialize/Upload firmware".

AUTO-UPLOAD DEFAULT(.MWS) SOUNDSET WHEN MICROWAVE PC IS INITIALIZED.

As we've seen, the microWAVE PC has to be supplied with Sounds before use.
This procedure can also be done automatically at the start-up of the program. If this setting is deactivated you'll have to upload the Sounds manually. This is done in the "Ed!t"-Menu by selecting "Send Set". A default Soundset will be uploaded, the Soundset is called DEFAULT.MWS and can be found in the same directory as the software.

AUDIO ROUTING - SELECTING THE RIGHT PATH.

The microWAVE PC is connected to the EWS64 board using the digital S/PDIF-Interface. This gives us several very useful Routing-possibilities which will be explained in this chapter. The Routing-Window can be selected in the "Options"-Menu or using key-combination "Ctrl+R".
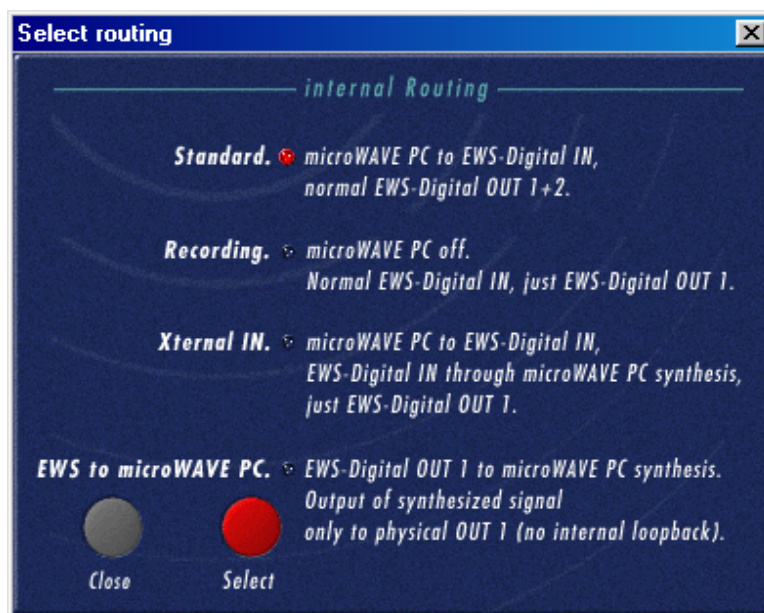
Picture 12: Audio Routing - Selecting the right path.

STANDARD.

In this Mode you can hear the microWAVE PC "simply" over the Digital-In of the EWS64 (In-2). Next to that the Output signal is also supplied to both the Digital-Out connectors of the Front-panel. If you should hook up additional external converters, you can even use four Outputs of the microWAVE PC.

RECORDING

In this Mode, the microWAVE PC is deactivated to be able to transfer the Digital signal 1:1 to the EWS64. Select this setting if want to make a Digital recording (e.g. DAT or Minidisc).

XTERNAL IN.

This is one of the most interesting modes of the microWAVE PC. A signal coming from a connected Digital device is Routed through the Synthesizer of the microWAVE PC to the Digital-Input of the EWS64. This external signal will be used as an Oscillator and is therefor only available as a Mono signal and will be activated you play a MIDI-Note. Volume can be set on the second MIX-page of the Oscillators, the Input-Gain can be set on the GLOBAL-page.

ⓘ   Tip: Are you disturbed by the signal of the others Oscillators (Wave 1+2, Ringmodulator and Noise), then turn the related Volume-parameters down.

EWS64 to microWAVE PC.

Also very interesting is the combination of the microWAVE PC with the Sampler- or Digital Audio-part of the EWS64. In this mode - like in the Xternal IN-mode - you can Route a digital signal through the microWAVE PC. This time it will be a signal that is generated by the EWS64 which you Route to Output 1. For technical reasons you can only hear this signal through the Digital Output on the microWAVE PC-frontpanel. The OUT-1 fader should be set down in the EWS64 Control-panel.

In the development of the microWAVE PC we've integrated even more Routing possibilities. These special features are meant for very experienced EWS64-users, like the activating of Routings by sending MIDI-SYSEX messages. For example : The both Stereo-Outputs are being set to be only used by the EWS64 internal Sampler or the Digital Audio-part and the microWAVE PC-signal separately to two split Digital Outputs. By using two external D/A-converters the microWAVE PC can be connected to a Mixing-desk and bound in the Mix independent from the EWS64.

The SYSEX-commands can be found in the appendix under SYSEX-documentation.

ⓘ　**Tip: Select one of the single outputs of the EWS64.**
It is possible to Route the Audio-Output of the microWAVE PC to one of the both single Outputs of the EWS64. Default this signal is Routed to the Analogue OUT-1 of the card. By using the program "Audio-IN"-panel (EWSAUDIN.EXE) you can also assign OUT-2. With this setting you can e.g. assign OUT-1 for the EWS64 Sampler exclusively. Note: This application of the Output-2 is only possible when the EWS64 Effect-processor is **deactivated.**

Library - The Sound-management.

The "Library"-Window gives us an overview of the current Sound that are loaded in the microWAVE PC. Next to that it offers you easy functions for loading, adding and saving Sounds. The Library can be accessed by choosing the "Options"-Menu and select "Library" or by pressing key-combination "Ctrl+L". When the "Library"-Window is opened you can still work in Main Window (microWAVE-user-interface). The different short-cut key-combinations are also still applicable, so you can still play a sound by pressing "SPACE" and select a sound using Arrow-up/down. The keys "M" and "S" are used to switch between Sound-and Multi-mode..
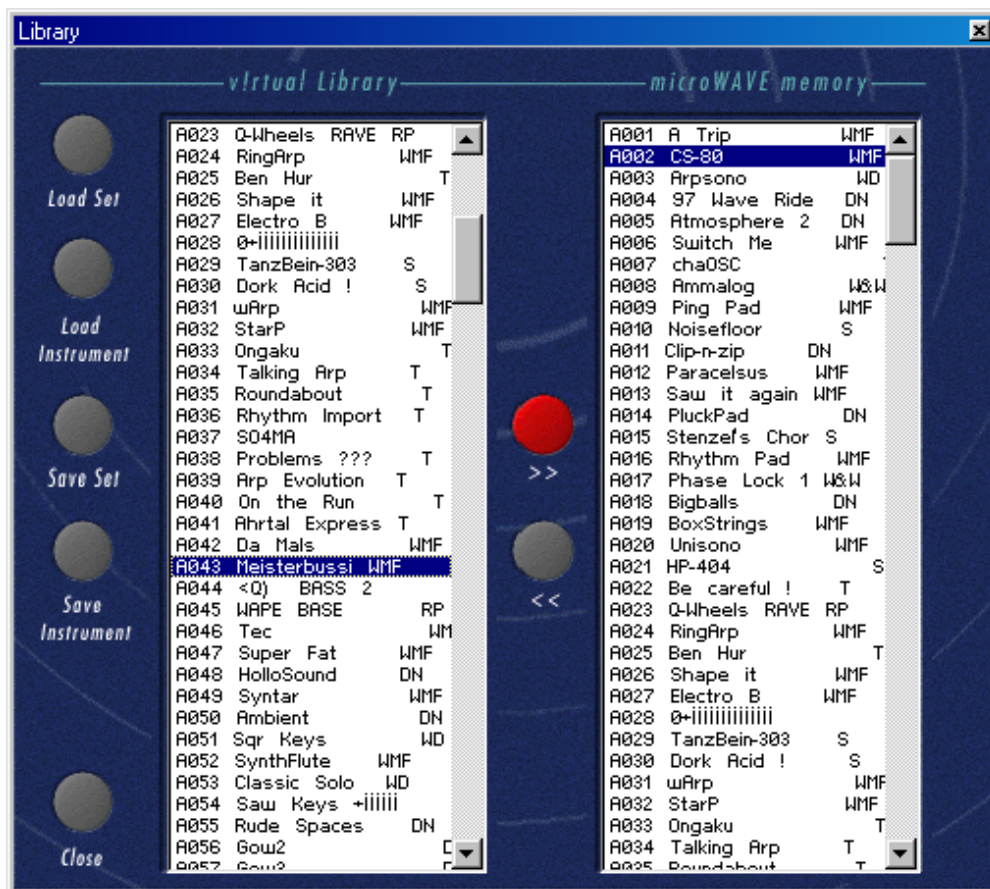
Picture 13: The Library-function with its friendly Sound-management.

On the right page (microWAVE memory) all the currently loaded Sounds are shown. These are the Sounds that are currently in the memory of the microWAVE PC module. The sounds can be selected by a Mouse-click or with your PC-keyboard to be heard.

On the left page the Sounds are shown which are in the "Virtual memory". With the button "Load Set" a complete Soundset is uploaded into the Virtual Library, to afterwards transfer each individual sound.

"Load Instrument" uploads separate instruments. "Save Set" and "Save Instrument" save the particular formats. The "Save Instrument"-option needs to have an instrument chosen.

The individual instruments can be moved by pressing the ">>" and "<<" . To transfer complete Soundsets into the microWAVE PC memory, use the "Open Set" in the "File"-Menu (or "Ctrl+O") and then select "Send Set" from the "Ed!t"-Menu.

Always On Top.

It often happens that you work with several applications at the same time, to maintain full control and monitoring on your microWAVE PC - like in a studio - we can activate the "Always On Top"-function in the "Options"-menu or by key-combination "Ctrl+T".

The Standby Function.

In case that you might not want to hear the microWAVE PC, you should activate the "Standby"-function from the "Options"-menu (or "Ctrl+Esc"). The software won't receive any MIDI-data anymore or passes it through. There's also a Volume-command send which sets the microWAVE PC in a "sleep"-mode. With the another program-call it will be activated again.

Transferring Sounds from the microWAVE PC to the microEd!t-Software.

The microWAVE PC is also compatible with sound-data which were originally programmed for the microWAVE II and the microWAVE XT. These sounds can be transferred via MIDI to the microWAVE PC. To let the software know that these new sounds are available within the module, we need to withdraw this information. This is done by the "Receive Instruments"- and "Receive Multis"-function in the "Ed!t"-Menu. After the reception of the Sounds you should save the Sounds in the microEd!t format in order to be able to mix them with other Sounds in the Library.

The Panic-function.

Now and than it happens when using MIDI-devices that a Note simply "hangs". For this case you can select the "Panic"-function in the "Ed!t"-Menu (or "Esc").

THE SHIFT-MENU.

In the "Shift"-Menu you'll find those functions which are directly related to the actual Sound-programming.
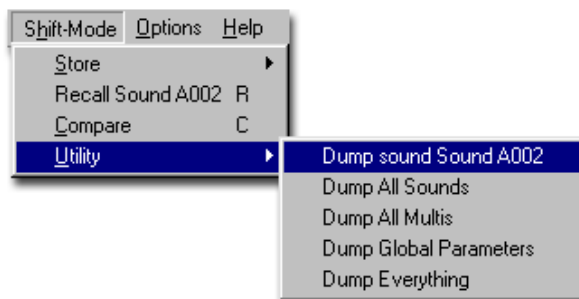
Picture 14: The Shift menu

STORE.

During the editing of a sound, this sound is available in the special microWAVE PC memory - the Edit-Buffer. Up to 8 Edit-Buffers can be set active at the same time, this means that up to 8 sounds can be edited simultaneously. If you try to edit a ninth sound, the former edited sounds will be set back to their default-values.(The former made changes will be lost.) By using the function "Store Sound" you save the edited contents of the Edit-Buffer to the chosen location in the microWAVE PC. When choosing another location, first save the instrument on the harddisk with the function "Save Instrument" from the "File"-Menu and upload this in a later stadium using the "Library", where you can select a location.

The function "Store-All Edits" saves all active Buffers at once.

RECALL SOUND XYZ.

The "Recall"-function resets the sound back to its original values.(e.g. if you don't like the editing you've done). The "Recall"-command is being triggered by the "R" key.

ⓘ   The "Recall"-function can also be useful when you've just initialised the microWAVE PC and no Soundset is loaded yet and you want to play a single Instrument. Without immediately uploading a complete Soundset, the "Recall"-command will load a single sound over System Exclusive to the microWAVE PC.

COMPARE SOUND XYZ

By using the "Compare"-function you can easily switch between the edited sound and its original. This function is great to quickly compare the result of your editing with the original sound. To compare press the "C"-key.

In the "Compare"-mode it's only possible to compare and play the sound, so no editing is possible in this mode. The "Compare"-mode is recognised by the little "c" behind the Sound-number in the display on the main page (by pressing "S").

UTILITY

Under the "Utility"-feature you'll find various "Send"-functions.

With these functions you can send:

• Single Sounds

• All Sounds

• All Multis

• The Global settings (From the "Global"-Menu)

• Or all settings...

via MIDI and transfer it to e.g. a Sequencer-program. Please select the appropriate MIDI-driver in the Preferences-window. This will usually be one of the Virtual MIDI-drivers of the EWS64 which are meant to connect the different MIDI-applications.

RENAME OR NAME SOUNDS.

If you've programmed a Sound it's obvious that want to give this Sound a name. In the microWAVE manual a procedure is described using the Wheel and the knobs. We assume that you are using a normal PC-keyboard and that makes it much easier. Just click the old name and fill in the new one. Than save the new Sound as an Instrument into the microWAVE PC module (Shift-Menu >Store, otherwise it only exists in the Edit-Buffer.) and afterwards also save this Sound on harddisk (File-Menu>Save Instrument).
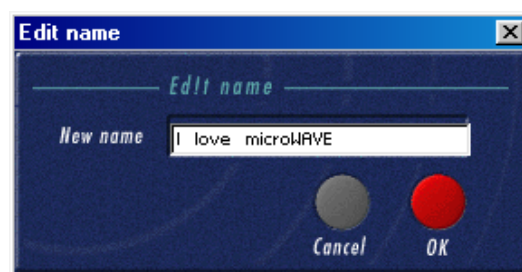
Picture 15:

ⓘ   Tip: Most programmers use the last three digits for their initials.

MORE TIPS

COMMUNICATIONS WITH OTHER MIDI-APPLICATIONS.

This chapter describes the operation of the microWAVE PC in combination with other Audio/MIDI-sequencers and/or editors.

Basically the microWAVE PC can also be used, after initialisation, **without the microEd!t-software**. Depending on the selected MIDI-Interface (MIDI-1 or MIDI-2 selected by jumper-setting) the microWAVE PC can be controlled with any MIDI-application. It'll respond like any modern Synthesizer on MIDI-Controllers like Volume, Panning, Program-changes etc. Basically any microEd!t Synthesis-function can be controlled by MIDI. In the following examples we assume that you connected the microWAVE PC with MIDI-1.

Using a Sequencer-program. (e.g. Cubase, Cakewalk or Logic) Select MIDI-1 for the specific MIDI-Track as Output-port and you'll hear the microWAVE PC - (as long as the track's midi-channel matches the microWAVE's midi-channel).(You can make the settings in the microWAVE PC-Global-Menu).

Recording Knob/Button actions. For the recording of knob and/or button actions you'll have to make other settings: use the EWS64 Virtual-MIDI-Driver. Select the Virtual-MIDI-Driver as Output device in the microEd!t Preferences-Menu(Output-Device e.g. V-MIDI Play #1). In the Sequencer select Record-Device e.g. Record #1 as the Input-driver. After this select the MIDI-Track using Output-port MIDI-1. Now all knob and/or button-actions will be transferred to the Module.

By the way, the MIDI-input in microEd!t should be set to "No MIDI Input", 'cause Note-information is now directly lead from the keyboard to the Sequencer and is being mixed with the signals of the V-MIDI-Record-Drivers.

The same combination shown in a graphic-chart.
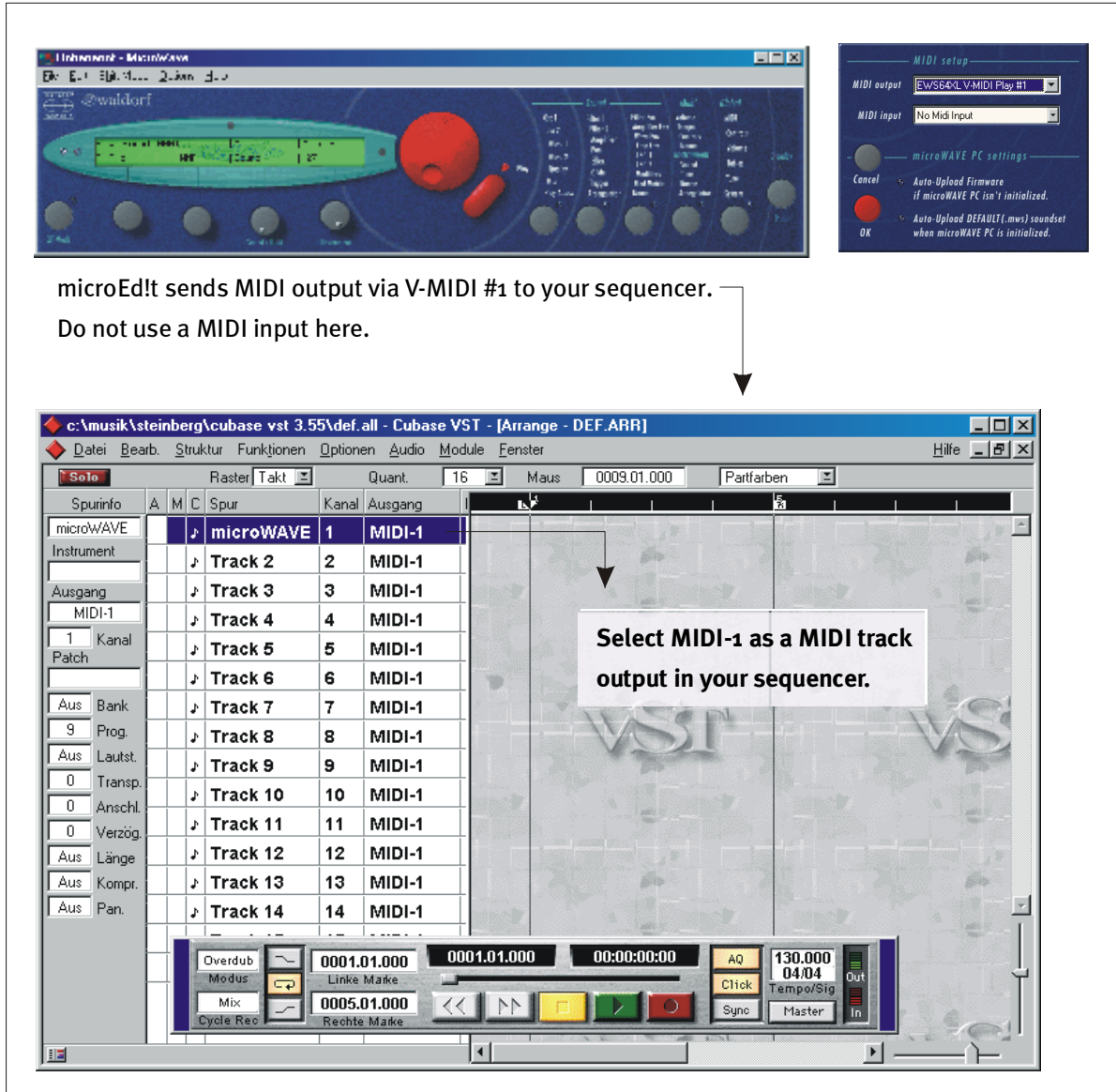
Picture 16: The microWAVE PC in combination with a Sequencer.

Also with software-editors like e.g. in Emagics SoundDiver or the Cubase Mixermaps the microWAVE PC can be combined. For this purpose select the appropriate settings for microWAVE II or XT. You should be aware that, due to technical reasons, no feedback-connection is possible with the current software-version. Loaded sound-data (e.g. Instrument names) can not be received. Editing though, is fully functional. Sound-programs can also be send to the module without any problem. These sound-programs can be handled with microEd!t.

USING THE EWS64 EFFECT-PROCESSOR.

The Audio-signal of the EWS64 can also be routed through the EWS64 Effect-processor. In the FX-panel of the EWS64-Software you can adjust the amount of Hall, Chorus and Delay. Using the effects disable the 4-channel-mode.

SELECTING SINGLE-OUTPUTS OF THE EWS64.

It is possible to route the Audio-signal of the microWAVE PC to one of the both Outputs of the EWS64. As a default-setting the signal is routed to the Analog-Out-1 of the board. By using the "Audio-In-Panel"-program (EWSAUDIN.EXE) it's possible to send the signal to Out-2. You could e.g. separately use Out-1 for the EWS64 Sampler. Please note that in case of the usage of the 4-channel-mode the EWS64 is shut down.

Picture 17: The microWAVE PC is now routed to the EWS's 2nd OUT.

INTERNAL RESAMPLING

Easy but brilliant is the possibility to save the complete audio-signal of the microWAVE PC on a digital level to the harddisk. Since the Output of the microWAVE PC is connected to the In-2 Input of the EWS64, like any other digital device, it's easy to Record its signal using Harddisk-recording programs like Ed!son Wave or Steinbergs Wavelab. For this purpose please select EWS64XL-Wave Record (not Codec-Record!). Next to this the EQ-/V-SPACE SEND in the Audio-In section (upper right) should be set to active and the Record switch set to Audio-In. You can also use the microWAVE PC Mixer-pre-set (microWAVE PC.TTM) in the EWS64 Control-Panel which takes care of all the mentioned settings.

🚗   **Note:** The Output-signal of the Waldorf Synthesis does not reach the 0dB level. This is normal for the Synthesizer and is not of any importance. For this reason you should Normalise the signal before further editing.

Afterwards you can upload your sound (or Multi or pre-recorded sequence) into the Ed!son Editor and send through the sound synthesis of the EWS sampler. By using a bit of your imagination you can produce sounds that just weren't possible before, or at least not as accessible as they are with the combination of the microWAVE PC and the EWS64. Let's take it one step further: How would it be to have a MIDI-Stack with the microWAVE PC and the EWS64 Sampler? Play your parts by using a sequencer and Resample the signal as described. Don't forget to use the Effects! And so on ....FFFaTTT J

APPENDIX

FAQ

I don't hear the microWAVE PC.

This can be caused by several things, up to now there are no bugs known and all known possibilities are related to wrong settings.

- Check if the IN-2 switch is set to "D" (Switch A-D-M). To remind you: A-for Analogue, D-for Digital (microWAVE PC) and M-for routing the EWS64-Codec-signal through the DSP.

- Check if the microWAVE PC's Output is maybe set to OUT-2 in the Audio-In-Panel. It could be that you didn't connect this Output to your Amp or powered speakers.

- In the microEd!t-software it's also possible to set different routings. In the Routing-Window (Ctrl+R) the "Recording"-mode can be selected. This setting should only be used when you want to make an Audio-recording over the Digital Input. With this setting the microWAVE PC is "BYPASSED", to leave the Audio-signal uninfluenced. You should select the "Standard"-setting.

- It could be that a MIDI-application (or microEd!t) send a "Volume"-command and muted the microWAVE PC's Output. Click twice on "Standby-Mode" (Button Right) or press the "RESET"-button in the EWS64 Control-Panel to give a "MIDI-RESET" -command.

- The MIDI-receive-channel of the microWAVE-PC and the Send-channel of your MIDI-keyboard don't match. Open the "Global"-Menu and click on MIDI.

During the initialisation faults occur (I hear distorted sounds and noises)

When this occurs you should check ones again if you have installed the EWS64 Driver-version 2.16(or higher) correctly. This is a must for proper operation of the microWAVE PC.

It might also be wise to check the connection of the flatcables again, they should be connected firmly to their slots.

I can only hear a Sinus-tone when I play the microWAVE PC.

You probably forgot to upload a Soundset. You should do this every time you restart the module. This can also be done automatically (in the "PREFERENCES"-window).

If you only want to play one single sound, select the specific sound and press the "Recall"-button. ("R").

A connected digital device cannot be recorded.

As described in the chapter "Audio Routing - Selecting the right path." you need to select the "Recording"-setting for the "good old " recording. Due technical reasons the module needs to be initialised first.

I connected a digital device to the Input, selected the "Xternal-In" setting but I still can't hear anything.

As described in the chapter "Audio Routing - Selecting the right path." you need to play a MIDI-note first. The external signal is being handled as an Oscillator by the microWAVE PC and should be seen as a normal WAVE-Oscillator that needs to be "triggered" by a MIDI-note.

I connected a digital device to the Input, selected the "Xternal-In" setting but I can only hear the sound very softly.

The level of the Input-signal can be adjusted in the "Global"-menu.

LIST OF SHORTCUTS.

The operation of the microWAVE PC can be simplified by learning the key-short-cuts. It also gives you the feel of using the "original hardware"..

Key	Function	Remarks
[Arrow Up]	Soundnumber +1	
[Arrow Down]	Soundnumber -1	
[Home]	Sound A001	
[End]	Sound B127	
[Shift+Number]	Direct Soundselection in Bank A	Number from the numeric pad with NUM-Lock disabled
[Strg+Shift+Number]	Direct Soundselection in Bank B	Number from the numeric pad with NUM-Lock disabled
[SPACE]	Play MIDI-Note (C3)	Note-Off letting the key go.
[A]	Arpeggiator HOLD / OFF	If you don't hear anything, Tempo is set to external.
[1]	Arpeggiator-resolution to 1 /1	Number above the letter-keys
[2]	Arpeggiator-resolution to 1 /2	Number above the letter-keys
[3]	Arpeggiator-resolution to 1 /4	Number above the letter-keys
[4]	Arpeggiator-resolution to 1 /8	Number above the letter-keys
[5]	Arpeggiator-resolution to 1 /16	Number above the letter-keys
[6]	Arpeggiator-resolution to 1 /32	Number above the letter-keys
[.]	Arpeggiator-resolution to dotted	Dot
[T]	Arpeggiator-resolution to tuplet	
[R]	Recall	
[C]	Compare	
[S]	Sound-Mode	Jump to 1th page
[M]	Multi-Mode	Jump to 1th page
[Esc]	Panic / All Notes Off	
[Ctrl+Esc]	Standby-Mode on / off	No MIDI-receiving and Volume 0
[Ctrl+N]	Initialize Instrument	
[Ctrl+O]	Load SoundSet	
[Ctrl+Shift+O]	Load Instrument	
[Ctrl+S]	Save SoundSet	
[Ctrl+Shift+S]	Save Instrument	
[Ctrl+X]	XT-Mode	
[Ctrl+P]	Preferences-Window	Basic settings
[Ctrl+R]	Audio-Routing-Window	
[Ctrl+L]	Library-Window	The Soundmanagement
[F1]	About-Window	Who, where and what ...
[Alt+F4]	Exit program	

MIDI-implementation and Charts.

MIDI Controller and Systemexklusive Data format.

Contr. No.	Range	Parameter	Value Range
1	0...127	Modulation wheel	0...127
2	0...127	Breath control	0...127
4	0...127	Foot controller	0...127
5	0...127	Glide Time	0...127
7	0...127	Channel Volume	0...127
10	0...127	Panning	left 64...center...right 63
12	0...1	Chorus	0:off 1:on
14	0...127	Filter Env Attack	0...127
15	0...127	Filter Env Decay	0...127
16	0...127	Filter Env Sustain	0...127
17	0...127	Filter Env Release	0...127
18	0...127	Amp Env Attack	0...127
19	0...127	Amp Env Decay	0...127
20	0...127	Amp Env Sustain	0...127
21	0...127	Amp Env Release	0...127
22	0...3	Glide Type	0:portamento 1:fingered port. 2:glissando 3:fingered gliss.
23	0...1	Glide Mode	0:exp. 1:linear
24	0...127	LFO1 Rate	0...127
25	0...5	LFO1 Shape	0:sin 1:tri 2:square 3:saw 4:random 5:S&H
26	0...127	LFO2 Rate	0...127
27	0...127	LFO2 Delay	0:off 1:retrigger 2...127:1...126
28	0...5	LFO2 Shape	0:sin 1:tri 2:square 3:saw 4:random 5:S&H
29	0...2	Filter Env Trigger	0:normal 1:single 2:retrigger
30	0...127	LFO1 Delay	0:off 1:retrigger 2...127:1...126
31	0...2	Amp Env Trigger	0:normal 1:single 2:retrigger
32	0...1	Bank Select	0:Bank A 1:Bank B
33	0...8	Osc 1 Octave	-4...+4
34	0...24	Osc 1 Semitone	-12...+12
35	0...127	Osc 1 Detune	-64...+63
36	0...121	Osc 1 Pitchbend Scale	0...120:semitones 121:harmonic
37	0...127	Osc 1 Keytrack	-100%...+200%
38	0...8	Osc 2 Octave	-4...+4
39	0...24	Osc 2 Semitone	-12...+12
40	0...127	Osc 2 Detune	-64...+63
41	0...1	Osc 2 Sync	0:off 1:on
42	0...121	Osc 2 Pitchbend Scale	0...120:semitones 121:harmonic
43	0...127	Osc 2 Keytrack	-100%...+200%
44	0...1	Osc 2 Link	0:off 1:on
45	0...127	Wave 1 Level	0...127
46	0...127	Wave 2 Level	0...127
47	0...127	RingMod Level	0...127
48	0...127	Noise Level	0...127
50	0...127	Filter 1 Cutoff	0...127
51	0...127	Filter 1 Keytrack	-200%...+197%
52	0...127	Filter 1 Env Amount	-64...+63
53	0...127	Filter 1 Env Velocity	-64...+63
54	0...5	Filter 1 Type	0:24dB LP 1:12dB LP 2:24dB BP

Contr. No.	Range	Parameter	Value Range
55	0...127	Amp Keytrack	-200%...+197%
56	0...127	Filter 1 Resonance	0...127
57	0...127	Amp Volume	0...127
58	0...127	Amp Env Velocity	-64...+63
60	0...127	Filter 2 Cutoff	0...127
61	0...1	Filter 2 Type	0:6dB LP 1:6dB HP
62	0...127	Filter 2 Keytrack	-200%...+197%
64	0...127	Sustain Switch	0...127
65	0...127	Glide on/off	0...127
70	0...127	Wavetable	Wavetable 001...128
71	0...63	Wave 1 Startwave	00...60 61:triangle 62:square 63:saw
72	0...127	Wave 1 Phase	0:free 1...127:3°...357°
73	0...127	Wave 1 Env Amnt.	-64...+63
74	0...127	Wave 1 Env Vel. Amnt.	-64...+63
75	0...127	Wave 1 Keytrack	-200%...+197%
76	0...1	Wave 1 Limit	0:off 1:on
77	0...63	Wave 2 Startwave	00...60 61:triangle 62:square 63:saw
78	0...127	Wave 2 Phase	0:free 1...127:3°...357°
79	0...127	Wave 2 Env Amnt.	-64...+63
80	0...127	Wave 2 Env Vel. Amnt.	-64...+63
81	0...127	Wave 2 Keytrack	-200%...+197%
82	0...1	Wave 2 Limit	0:off 1:on
83	0...1	Wave 2 Link	0:off 1:on
85	0...127	Free Env Time 1	0...127
86	0...127	Free Env Level 1	-64...+63
87	0...127	Free Env Time 2	0...127
88	0...127	Free Env Level 2	-64...+63
89	0...127	Free Env Time 3	0...127
90	0...127	Free Env Level 3	-64...+63
91	0...127	Free Env Release Time	0...127
92	0...127	Free Env Release Level	-64...+63
93	0...2	Free Env Trigger	0:normal 1:single 2:retrigger
102	0...2	Arp Active	0:off 1:on 2:hold
103	0...9	Arp Range	1...10 Octaves
104	0...15	Arp Clock	1/1...1/32
105	0...127	Arp Tempo	0:external 1...127:50...300BPM
106	0...3	Arp Direction	0:up 1:down 2:alternate 3:random
107	0...16	Arp Pattern	0:off 1:user 2...16:Pattern 1...15
108	0...3	Arp Note Order	0:by note 1:note rev 2:as played 3:reversed
109	0...1	Arp Velocity	0:root note 1:last note
110	0...1	Arp Reset	0:off 1:on
111	0...15	Arp Pattern Length	1...16
112	0...3	LFO 1 Sync	0:off 1:on 3:Clock
113	0...127	LFO 1 Symmetry	-64...+63
114	0...127	LFO 1 Humanize	0...127
115	0...3	LFO 2 Sync	0:off 1:on 3:Clock
116	0...127	LFO 2 Symmetry	-64...+63
117	0...127	LFO 2 Humanize	0...127
118	0...127	LFO 2 Phase	0:free 1...127:3°...357°
120	0	All Sound Off	
121	0	Reset All Controllers	
123	0	All notes off	

SYSTEMEXKLUSIVE DATA FORMAT

Waldorf Microwave 2 System Exclusive Specifications,
Software release 2.09

1. General

****

Sys-Ex dumps and requests will always be in the
following form:
F0h IDW DEV IDM LOC --------Data--------- CHKSUM F7h
where
h   : Hex
IDW   : Waldorf MIDI ID = 3Eh
IDE   : Equipment ID = 0Eh for MicroWave 2
DEV   : Device number, 00h to 7Eh, 7Fh = broadcast
IDM   : Message ID
LOC   : Location
Data   : whatever data bytes, 00h to 7Fh
CHKSUM : Sum of all databytes truncated to 7 bits.
          The addition is done in 8 bit format, the
          result is masked to 7 bits (00h to 7Fh). A
          checksum of 7Fh is always accepted as valid.
          IMPORTANT: the MIDI status-bytes as well as
          the ID's are not used for computing the
          checksum.
          If there are no data-bytes in the message
          (simple request), the checksum will always
          be 00h.

****

1.1 Message IDs (IDM)

****

Message IDs (IDM) are organized in a matrix where the
row defines the data type and the column identifies
the type of dump. The data type is coded in the four
least significant bits of the IDM. Following data
types are currently defined:

Label	Value	Description
SNDx	x0h	Sound data type
MULx	x1h	Multi data type
WAVx	x2h	Wave data type
WCTx	x3h	Wave control table data type
GLBx	x4h	Global Parameters
DISx	x5h	Display
RMTx	x6h	Remote control
MODx	x7h	Mode (sound/Multimode)
INFx	x8h	Information

The dump type is coded in the upper three bits of IDM,
note that bit seven cannot be used. Following dump
types
are currently defined:

Label	Value	Description
xxxR	0xh	Request
xxxD	1xh	Dump
xxxP	2xh	Parameter Change
xxxS	3xh	Store command
xxxL	4xh	Recall Command
xxxC	5xh	Compare command

Not all combinations of dump types and data types are
currently supported, only those given below:
Request (xxxR = 0x)
 | Dump (xxxD = 1x)
 | | Parameter Change (xxxP = 2x)
 | | | Store (xxxS = 3x)
 | | | | Recall (xxxL = 4x)
 | | | | | Compare (xxxC = 5x)
 | | | | | | Data Type
----
00 10 20   SNDx x0   Sound
01 11   MULX x1   Multi
02 12   WAVx x2   Wave
03 13   WCTx x3   Wavetable
04 14 24   GLBx x4   Global Parameters
05 15 25   45 DISx x5   Display
      26   RMTx x6   Button / Dial remote
07 17   MODx x7   Mode

So follwing valid IDM exist:

Label	Value	Description
SNDR	00h	Sound Request
SNDD	10h	Sound Dump
SNDP	20h	Sound Parameter Change
MULR	01h	Multi Request
MULD	11h	Multi Dump
WAVR	02h	Wave Request
WAVD	12h	Wave Dump
WCTR	03h	Wave Control Table Request
WCTD	13h	Wave Control Table Dump
GLBR	14h	Global Parameter Request
GLBD	14h	Global Parameter Dump
DISR	05h	Display Request
DISD	15h	Display Dump
DISP	25h	Display Parameter Change
DISL	45h	Display Recall
RMTD	26h	Remote Dump
MODR	07h	Mode Request
MODD	17h	Mode Dump

****

2. Details
2.11 SNDR

****

SNDR   00h   Sound Request
Upon reception of a valid sound request the MW2 will
dump the selected Sound(s). The location is given in
two bytes with following conventions:
BB NN   Location
----
00 00 .. 00 7F Locations A001..A128
01 00 .. 01 7F Locations B001..B128
10 00   All Sounds
20 00   Sound Mode Edit Buffer
30 00 .. 30 07 Multi Instrument Edit Buffers

So the full format of a SNDR Dump is:

Index	Label	Value	Description
0	EXC	F0h	Marks Start of SysEx
1	IDW	3Eh	Waldorf Electronics GmbH ID
2	IDE	0Eh	Microwave 2 ID
3	DEV		Device ID
4	IDM	00h	here SNDR (Sound request)
5	BB	see Text	Location
6	NN	see Text	Location
7	XSUM	(BB+NN)&7Fh	Checksum
8	EOX	F7h	End os SysEx

****

2.12 SNDD

****

SNDD   10h   Sound Dump
A sound dump is used to transfer sound data from and
to the Microwave 2. The location is given in two bytes
with following conventions:
BB NN   Location
----
00 00 .. 00 7F Locations A001..A128
01 00 .. 01 7F Locations B001..B128
10 00   All Sounds
20 00   Sound Mode Edit Buffer
30 00 .. 30 07 Multi Instrument Edit Buffers

So the full format of a SNDD Dump is:

Index	Label	Value	Description
0	EXC	F0h	Marks Start of SysEx
1	IDW	3Eh	Waldorf Electronics GmbH ID
2	IDE	0Eh	Microwave 2 ID
3	DEV		Device ID
4	IDM	10h	here SNDD (Sound Dump)
5	BB	see above	Location
6	NN	see above	Location
7-262	SDATA	see 3.1	Sound data
263	XSUM	(BB+NN+SDATA)&7Fh	Checksum
264	EOX	F7h	End os SysEx

```
------------------------------------------------
Or in case of All Sounds Dump:
Index   Label   Value           Description
------------------------------------------------
0       EXC     F0h             Marks Start of SysEx
1       IDW     3Eh             Waldorf Electronics
                                GmbH ID
2       IDE     0Eh             Microwave 2 ID
3       DEV                     Device ID
4       IDM     10h             here SNDD (Sound
                                Dump)
5       BB      see above       Location
6       NN      see above       Location
7-65542 SDATA[256]  see 3.1     256 times Sound data
                                from A001 to B128
65543   XSUM    (BB+NN+SDATA)&7Fh Checksum
65544   EOX     F7h             End os SysEx
------------------------------------------------
************************************************
2.13 SNDP
************************************************
SNDP    20h     Sound Parameter Change

Upon reception of a valid Sound Parameter Change dump,
the specified parameter will change its value
immediately according to the given value. The
location is given in one byte with following
conventions:

LL              Location
------------------------------------------------
00h             Sound Mode Edit Buffer or...
00h..07h        Multi Mode Instrument 1..8 sound
                buffer
------------------------------------------------
The Parameter index is given in two bytes:

HH  PP          Parameter index
------------------------------------------------
00h 00..7Fh     Parameters with indices 0 to 127
01h 00..7Fh     Parameters with indices 0 to 127
------------------------------------------------

See 3.1 for a detailed list of parameters and indices.

So the actual Format is:

Index   Label   Value           Description
------------------------------------------------
0       EXC     F0h             Marks Start of SysEx
1       IDW     3Eh             Waldorf Electronics
                                GmbH ID
2       IDE     0Eh             Microwave 2 ID
3       DEV                     Device ID
4       IDM     20h             here SNDP (Sound
                                Parameter change)
5       LL      see above       Location
6       HH      see above       Parameter index high
                                bit
7       PP      see above       Parameter index
8       XX      see 3.1         New Parameter value
9       EOX     F7h             End of Exclusive
------------------------------------------------

Note that the checksum is omitted here.
************************************************
2.21 MULR
************************************************
MULR    11h     Multi Request

Upon reception of a valid multi request the MW2 will
dump the selected Multi(s). The location is given in
two bytes with following conventions:

BB NN           Location
------------------------------------------------
00 00 .. 00 7F  Locations 001..128
10 00           All Multis
20 00           Edit Buffer
------------------------------------------------

So the full format of a MULR Dump is:
```

```
Index   Label   Value           Description
------------------------------------------------
0       EXC     F0h             Marks Start of SysEx
1       IDW     3Eh             Waldorf Electronics
                                GmbH ID
2       IDE     0Eh             Microwave 2 ID
3       DEV                     Device ID
4       IDM     01h             here MULR (Multi
                                request)
5       BB      see Text        Location
6       NN      see Text        Location
7       XSUM    (BB+NN)&7Fh     Checksum
8       EOX     F7h             End os SysEx
------------------------------------------------
************************************************
2.22 MULD
************************************************
MULD    21h     Multi Dump

A multi dump is used to transfer multi data from and
to the Microwave 2. The location is given in two bytes
with following conventions:

BB NN           Location
------------------------------------------------
00 00 .. 00 7F  Locations 001..128
10 00           All Multis
20 00           Edit Buffer
------------------------------------------------
So the full format of a MULD Dump is:

Index    Label   Value           Description
------------------------------------------------
0        EXC     F0h             Marks Start of SysEx
1        IDW     3Eh             Waldorf Electronics
                                 GmbH ID
2        IDE     0Eh             Microwave 2 ID
3        DEV                     Device ID
4        IDM     11h             here MULD (Multi
                                 Dump)
5        BB      see above       Location
6        NN      see above       Location
7-38     MDATA   see 3.2         Multi data
39-66    IDATA   see 3.3         Instrument #1 data
67-94    IDATA   see 3.3         Instrument #2 data
95-122   IDATA   see 3.3         Instrument #3 data
123-150  IDATA   see 3.3         Instrument #4 data
151-178  IDATA   see 3.3         Instrument #5 data
179-206  IDATA   see 3.3         Instrument #6 data
207-234  IDATA   see 3.3         Instrument #7 data
235-262  IDATA   see 3.3         Instrument #8 data
263      XSUM    (BB+NN+DATA)&7Fh Checksum
264      EOX     F7h             End os SysEx
------------------------------------------------
************************************************
2.23 MULP
************************************************
MULP    20h     Multi Parameter Change

Upon reception of a valid Multi Parameter Change dump,
the specified parameter will change its value
immediately according to the given value. In Sound
Mode, all MULP messages will be ignored. The location
is given in one byte with following conventions:

LL              Location
------------------------------------------------
20h             Multi Edit Buffer
01h..07h        Multi Mode Instrument 1..8 buffer
------------------------------------------------

The Parameter index is given in one byte:

PP              Parameter index
------------------------------------------------
00..1Fh Parameters with indices 0 to 31
------------------------------------------------

See 3.2 for a detailed list of Multi parameters and
indices, or 3.3 for a detailed list of Instrument
parameters and indices.
```

The actual Format is:

```
Index   Label   Value           Description
----------------------- ----------------------
0       EXC     F0h             Marks Start of SysEx
1       IDW     3Eh             Waldorf Electronics
                                GmbH ID
2       IDE     0Eh             Microwave 2 ID
3       DEV                     Device ID
4       IDM     21h             here MULP (Sound
                                Parameter change)
5       LL      see above       Location
7       PP      see above       Parameter index
8       XX      see 3.2/3.3     New Parameter value
9       EOX     F7h             End of Exclusive
----------------------------------------------------
****************************************************
```

2.31 WAVR
****

WAVR   02h   Wave Request

Upon reception of a valid wave request the MW2 will
dump the selected Wave. The location is given in two
bytes with following conventions:

```
HH LL           Location
------------------------------------------------
00 00 .. 00 7F  ROM Waves 000..127
01 00 .. 01 7F  ROM Waves 128..255
01 00 .. 01 2B  ROM Waves 256..299
07 68 .. 07 7F  User Waves 1000..1023
08 00 .. 08 7F  User Waves 1024..10151
09 00 .. 09 61  User Waves 1152..1249
------------------------------------------------
```

So the full format of a WAVR Request is:

```
Index   Label   Value           Description
--------------------------------------------------
0       EXC     F0h             Marks Start of SysEx
1       IDW     3Eh             Waldorf Electronics
                                GmbH ID
2       IDE     0Eh             Microwave 2 ID
3       DEV                     Device ID
4       IDM     02h             here WAVR (Wave
                                request)
5       HH      see Text        Location
6       LL      see Text        Location
7       XSUM    (HH+LL)&7Fh     Checksum
8       EOX     F7h             End os SysEx
--------------------------------------------------
****************************************************
```

2.32 WAVD
****

WAVD   12h   Wave Dump

A wave dump is used to transfer wave data from and to
the Microwave 2. The location is given in two bytes
with following conventions:

```
HH LL           Location
------------------------------------------------
00 00 .. 00 7F  ROM Waves 000..127
01 00 .. 01 7F  ROM Waves 128..255
01 00 .. 01 2B  ROM Waves 256..299
07 68 .. 07 7F  User Waves 1000..1023
08 00 .. 08 7F  User Waves 1024..10151
09 00 .. 09 61  User Waves 1152..1249
------------------------------------------------
```

So the full format of a WAVD Dump is:

```
Index   Label   Value           Description
--------------------------------------------------
0       EXC     F0h             Marks Start of SysEx
1       IDW     3Eh             Waldorf Electronics
                                GmbH ID
2       IDE     0Eh             Microwave 2 ID
3       DEV                     Device ID
4       IDM     12h             here WAVD (Wave
                                Dump)
5       HH      see above       Location
6       LL      see above       Location
7-134   WDATA   see 3.4         Wave data
135     XSUM    (HH+LL+WDATA)&7Fh Checksum
136     EOX     F7h             End os SysEx
--------------------------------------------------
****************************************************
```

2.41 WCTR
****

WCTR   03h   Wave Control Table Request

Upon reception of a valid wave control table request,
the MW2 will dump the selected Table. The location is
given in two bytes with following conventions:

```
HH LL           Location
----------------------------------------------------
00 00 .. 00 7F  Control Table of Wavetables 001..128
----------------------------------------------------
```

Note that some Wavetables are generated
algorithmically and have no control table, an attempt
to request such a table will fail.

The full format of a WCTR Request is:

```
Index   Label   Value           Description
----------------------------------------------------
0       EXC     F0h             Marks Start of SysEx
1       IDW     3Eh             Waldorf Electronics
                                GmbH ID
2       IDE     0Eh             Microwave 2 ID
3       DEV                     Device ID
4       IDM     03h             here WCTR(Wavetable
                                request)
5       HH      see Text        Location
6       LL      see Text        Location
7       XSUM    (HH+LL)&7Fh     Checksum
8       EOX     F7h             End os SysEx
----------------------------------------------------
****************************************************
```

2.42 WCTD
****

WAVD   13h   Wave ControlDump

A Control Table dump is used to transfer Wavetable
Control Table data from and to the Microwave 2. The
location is given in two bytes with following
conventions:

```
HH LL           Location
----------------------------------------------------
00 00 .. 00 7F  Control Table of Wavetables 001..128
----------------------------------------------------
```

Note that only Wavetables 96 to 128 are User
Wavetables, an attempt to overwrite a wavetable
outside this range will fail.

The full format of a WAVD Dump is:

```
Index   Label   Value           Description
----------------------------------------------------
0       EXC     F0h             Marks Start of SysEx
1       IDW     3Eh             Waldorf Electronics
                                GmbH ID
2       IDE     0Eh             Microwave 2 ID
3       DEV                     Device ID
4       IDM     13h             here WCTD (Wavetable
                                Dump)
5       HH      see above       Location
6       LL      see above       Location
7-262   WCTDATA see 3.5         Wave control table
263     XSUM    (HH+LL+WCTDATA)&7Fh Checksum
264     EOX     F7h             End of SysEx
----------------------------------------------------
****************************************************
```

```
2.51 GLBR                                            2.61 DISR
*************************************************     *************************************************
WCTR    04h    Global Parameter Request              DISR    05h    Display Request

Upon reception of a valid Global Parameter request,  Upon reception of a valid Display Request request, the
the MW2 will dump the Global Parameters. No location MW2 will dump the contents of the LCD. No location is
is given.                                            given.

The full format of a GLBR Request is:                The full format of a DISR Request is:

Index  Label  Value       Description                Index  Label  Value       Description
-------------------------------------------------    -------------------------------------------------
0      EXC    F0h         Marks Start of SysEx        0      EXC    F0h         Marks Start of SysEx
1      IDW    3Eh         Waldorf Electronics         1      IDW    3Eh         Waldorf Electronics
                          GmbH ID                                              GmbH ID
2      IDE    0Eh         Microwave 2 ID              2      IDE    0Eh         Microwave 2 ID
3      DEV                Device ID                   3      DEV                Device ID
4      IDM    04h         here GLBR (Global           4      IDM    05h         here DISR (LCD
                          Parameter request)                                   request)
7      XSUM   0           Checksum                    7      XSUM   0           Checksum
8      EOX    F7h         End os SysEx                8      EOX    F7h         End os SysEx
-------------------------------------------------    -------------------------------------------------
*************************************************     *************************************************

2.52 GLBD                                            2.62 DISD
*************************************************     *************************************************
GLBD    14h    Global Parameter Dump                 DISR    15h    Display Dump

A Global Parameter dump is used to transfer Global   A Display Dump message is used to transfer LCD
Parameter date from and to the Microwave 2.          contents from and to the Microwave 2.

The full format of a GLBD Dump is:                   The full format of a DISD Request is:

Index  Label  Value       Description                Index  Label  Value       Description
-------------------------------------------------    -------------------------------------------------
0      EXC    F0h         Marks Start of SysEx        0      EXC    F0h         Marks Start of SysEx
1      IDW    3Eh         Waldorf Electronics         1      IDW    3Eh         Waldorf Electronics
                          GmbH ID                                              GmbH ID
2      IDE    0Eh         Microwave 2 ID              2      IDE    0Eh         Microwave 2 ID
3      DEV                Device ID                   3      DEV                Device ID
4      IDM    14h         here GLBD (Global           4      IDM    15h         here DISD (LCD dump)
                          Parameter Dump)             5-84   LCDDATA ASCII      Upper and lower row
5-36   GDATA  see 3.6     Global Parameter                                     of LCD
                          Data                        85     LEDDATA            LEDs Bitmask:
37     XSUM   GDATA&7Fh   Checksum                                             01: MIDI
38     EOX    F7h         End of SysEx                                         02: Column #1
-------------------------------------------------                              04: Column #2
*************************************************                              08: Column #3
                                                                              10: Column #4
2.53 GLBP                                                                     20: Column #5
*************************************************                              40: Play
GLBP    24h    Global Parameter Change               86     XSUM   0           Checksum
                                                     87     EOX    F7h         End os SysEx
Upon reception of a valid Global Parameter Change    -------------------------------------------------
dump, the specified parameter will change its value  *************************************************
immediately according to the given value.
                                                     2.63 DISP
                                                     *************************************************
See 3.6 for a detailed list of parameters and indices. DISP   25h    LCD Parameter change

The actual Format is:                                A LCD  Parameter Change is used to change a single
                                                     character in the LCD of the the Microwave 2.
Index  Label  Value       Description
-------------------------------------------------    The full format of a DISP Dump is:
0      EXC    F0h         Marks Start of SysEx
1      IDW    3Eh         Waldorf Electronics         Index  Label  Value       Description
                          GmbH ID                     -------------------------------------------------
2      IDE    0Eh         Microwave 2 ID              0      EXC    F0h         Marks Start of SysEx
3      DEV                Device ID                   1      IDW    3Eh         Waldorf Electronics
4      IDM    24h         here GLBP (Global                                    GmbH ID
                          Parameter change)           2      IDE    0Eh         Microwave 2 ID
5      PP     see above   Parameter index             3      DEV                Device ID
6      XX     see 3.1     New Parameter value         4      IDM    25h         here DISP (LCD
7      EOX    F7h         End of Exclusive                                      Parameter change)
-------------------------------------------------    5      LOC    0-79        Index of character
                                                                              in LCD
Note that the checksum is omitted here.              6      CHAR   ASCII       New character
*************************************************     7      XSUM   (LOC+CHAR)&7Fh Checksum
                                                     8      EOX    F7h         End of SysEx
                                                     -------------------------------------------------
                                                     *************************************************
```

```
2.64 DISL                                          2.81 MODR
***************************************************  ***************************************************
DISL    45h     LCD Recall                          MODR    07h     Mode Request


Upon receprion of a Display Recall message, the LCD  The full format of a MODR Dump is:
and the LEDs will be updated in order to discard a
possibly previously dumped LCD content.             Index   Label   Value          Description
                                                    --------------------------------------------------
                                                    0       EXC     F0h            Marks Start of SysEx
The full format of a DISL Dump is:                  1       IDW     3Eh            Waldorf Electronics
                                                                                   GmbH ID
Index   Label   Value     Description               2       IDE     0Eh            Microwave 2 ID
--------------------------------------------------   3       DEV                    Device ID
0       EXC     F0h       Marks Start of SysEx       4       IDM     07h            here MODR
1       IDW     3Eh       Waldorf Electronics        5       EOX     F7h            End of SysEx
                          GmbH ID                    --------------------------------------------------
2       IDE     0Eh       Microwave 2 ID             ***************************************************
3       DEV               Device ID                  2.82 MODD
4       IDM     45h       here DISL (LCD Recall)     ***************************************************
5       XSUM    0         Checksum                   MODD    17h     Mode Dump
6       EOX     F7h       End of SysEx
--------------------------------------------------
***************************************************  The full format of a MODD Dump is:
2.71 RMTP
***************************************************  Index   Label   Value          Description
RMTP    26h     Remote Control Parameter Change     --------------------------------------------------
                                                    0       EXC     F0h            Marks Start of SysEx
                                                    1       IDW     3Eh            Waldorf Electronics
The remote control Parameter change is used to                                     GmbH ID
remotely control the encoders and buttons of the    2       IDE     0Eh            Microwave 2 ID
Microwave 2. Operation might still introduce bugs.  3       DEV                    Device ID
                                                    4       IDM     17h            here MODD
The Element to move is coded in one byte:           5       Mode    0-1            0: Sound 1:Multi
                                                    6       EOX     F7h            End of SysEx
UU              Element                              --------------------------------------------------
--------------------------------------------------   ***************************************************
00              Encoder #1       (left)
01              Encoder #2
02              Encoder #3
03              Encoder #4
04              Encoder #5       (big red one)
05              Play/Shift button
06              Soundpar #1/Store button
07              Soundpar #2/Recall button
08              Soundpar #3/Compare button
09              Multipar/Undo button
0A              Global/Utility button
0B              Power button
--------------------------------------------------



Annother byte defines the movement to be simulated:

MM              Encoder               Button
--------------------------------------------------
00              encoder left turn -64   released
01              encoder left turn -63   pressed
2-63            encoder left by MM      pressed
64              no encoder move         pressed
65              encoder right by one    pressed
66-127          encoder right by MM     pressed
--------------------------------------------------



The full format of a RMTP Dump is:

Index   Label   Value          Description
--------------------------------------------------
0       EXC     F0h            Marks Start of SysEx
1       IDW     3Eh            Waldorf Electronics
                               GmbH ID
2       IDE     0Eh            Microwave 2 ID
3       DEV                    Device ID
4       IDM     26h            here RMTP
5       UU      see text       Element
6       MM      see text       Simulated movement
7       XSUM    (UU+MM)&7Fh    Checksum
8       EOX     F7h            End od SysEx
--------------------------------------------------
***************************************************
```

```
3. Data Formats
3.1 SDATA - Sound Data
*************************************************************************
Note: All Parameters marked as "reserved" should be set to 0 for future
compatibility.

Index   Range   Value                Parameter
-------------------------------------------------------------------------------
0       0-1     1                    Sound Format Version, currently 1, Format 0 is unpublished
1       16-112  -4...+4              Osc 1 Octave in Steps of 12
2       52-76   -12..+12             Osc 1 Semitone
3       0-127   -64..+64             Osc 1 Detune
4       reserved
5       0-122   0-120,harmonic,global  Osc 1 Pitch Bend Range
6       0-76    -100%..+200%         Osc 1 Keytrack
7       0-127                        osc 1 FM Amount !!
8       reserved
9       reserved
10      reserved
11      reserved
12      16-112  -4...+4              Osc 2 Octave in Steps of 12
13      52-76   -12..+12             Osc 2 Semitone
14      0-127   -64..+64             Osc 2 Detune
15      reserved
16      0-1     off/on               Osc 2 Sync
17      0-122   0-120,hm.,gl.        Osc 2 Pitch Bend Range
18      0-76    -100%..+200%         Osc 2 Keytrack
19      0-1     off/on               Osc 2 Link
20      reserved
21      reserved
22      reserved
23      reserved
24      reserved
25      0-127   0..127               Wavetable
26      0-63    0..60,tri,sqr,saw    Wave 1 Startwave
27      0-127   free,3-257 degree    Wave 1 Start Phase
28      0-127   -64..+64             Wave 1 Envelope Amount
29      0-127   -64..+64             Wave 1 Envelope Velocity Amount
30      0-127   -200%...+197%        Wave 1 Keytrack
31      0-1     off/on               Wave 1 Limit
32      reserved
33      reserved
34      reserved
35      reserved
36      0-63    0..60,tri,sqr,saw    Wave 2 Startwave
37      0-127   free,3-257 degree    Wave 2 Start Phase
38      0-127   -64..+64             Wave 2 Envelope Amount
39      0-127   -64..+64             Wave 2 Envelope Velocity Amount
40      0-127   -200%...+197%        Wave 2 Keytrack
41      0-1     off/on               Wave 2 Limit
42      0-1     off/on               Wave 2 Link
43      reserved
44      reserved
45      reserved
46      reserved
47      0-127   0..127               Mix Wave 1
48      0-127   0..127               Mix Wave 2
49      0-127   0..127               Mix Ringmod
50      0-127   0..127               Mix Noise
51      0-127   0..127               Mix External [XT only]  !!
52      reserved
53      0-5     off,1-5              Aliasing
54      0-5     off,1-5              Time Quantization
55      0-1     saturate/overflow    Clipping
56      reserved
57      0-1     off/on               Accuracy !!
58      0-82    see List 3.11        Play Parameter #1 !!
59      0-82    see List 3.11        Play Parameter #2 !!
60      0-82    see List 3.11        Play Parameter #3 !!
61      0-82    see List 3.11        Play Parameter #4 !!
62      0-127   0..127               Filter 1 Cutoff
63      0-127   0..127               Filter 1 Resonance
64      0-9     see List 3.15        Filter 1 Type !!
65      0-127   -200%..+197%         Filter 1 Keytrack
66      0-127   -64..+63             Filter 1 Envelope Amount
67      0-127   -64..+63             Filter 1 Envelope Velocity Amount
68      reserved
69      reserved
70      0-127   Context Sensitive    Filter 1 Special Parameter !!
71      reserved
72      reserved
73      0-127   0..127               Filter 2 Cutoff
74      0-1     6dB LP,6dB HP        Filter 2 Typ
75      0-127   -200%..+197%         Filter 2 Keytrack
76      0-7[MW2] 0-35[XT]            Effect Type (still subject to Change) !!
77      0-127   0..127               Amplifier Volume
78      reserved
79      0-127   -64..+63             Amplifier Envelope Velocity Amount
80      0-127   -200%..+197%         Amplifier Keytrack
```

```
81      0-127                           Effect Parameter #1 !!
82      0-1     off/on                  Chorus !!
83      0-127                           Effect Parameter #2 !!
84      0-127   left 64-center-right 63 Panning
85      0-127   -200%..+197%            Panning Keytrack
86      0-127                           Effect Parameter #3 !!
87      0-1     off/on                  Glide Active
88      0-3     porta,gliss,fp.,fg.     Glide Type
89      0-1     exp./linear             Glide Mode
90      0-127   0..127                  Glide Time
91      reserved
92      0-2     off,on,hold             Arpeggiator Active
93      1-127   extern,50-300 BpM       Arpeggiator Tempo
94      0-15    1/1..1/32               Arpeggiator Clock
95      1-10    1..10                   Arpeggiator Range
96      0..16   off,user,1..15          Arpeggiator Pattern
97      0-3     up,down,alt,random      Arpeggiator Direction
98      0-3     note,n.rev,played,p.rev Arpeggiator Note Order
99      0-1     root note/last note     Arpeggiator Velocity
100     0-1     off/on                  Arpeggiator Reset on Pattern Start
101     0-15    1..16                   Arpeggiator User Pattern Length
102     0-15    ----,---*,--*-,--**      Arpeggiator User Pattern Pos 1-4
103     0-15    -*--,-*-*,-**-,-***      Arpeggiator User Pattern Pos 5-8
104     0-15    *---,*--*,*-*-,*-**      Arpeggiator User Pattern Pos 9-12
105     0-15    **--,**-*,***-,****      Arpeggiator User Pattern Pos 13-16
106     reserved
107     reserved
108     0-1     Poly/Mono               Allocation Mode
109     0-2     normal/dual/unisono     Assignment
110     0-127   0..127                  Detune
111     reserved
112     0-127                           De-Pan !!
113     0-127   0..127                  Filter Env Attack
114     0-127   0..127                  Filter Env Decay
115     0-127   0..127                  Filter Env Sustain
116     0-127   0..127                  Filter Env Release
117     0-2     normal,single,retrigger Filter Env Trigger
118     reserved
119     0-127   0..127                  Amplifier Env Attack
120     0-127   0..127                  Amplifier Env Decay
121     0-127   0..127                  Amplifier Env Sustain
122     0-127   0..127                  Amplifier Env Release
123     0-2     normal,single,retrigger Amplifier Env Trigger
124     reserved
125     0-127   0..127                  Wave Env Time  1
126     0-127   0..127                  Wave Env Level 1
127     0-127   0..127                  Wave Env Time  2
128     0-127   0..127                  Wave Env Level 2
129     0-127   0..127                  Wave Env Time  3
130     0-127   0..127                  Wave Env Level 3
131     0-127   0..127                  Wave Env Time  4
132     0-127   0..127                  Wave Env Level 4
133     0-127   0..127                  Wave Env Time  5
134     0-127   0..127                  Wave Env Level 5
135     0-127   0..127                  Wave Env Time  6
136     0-127   0..127                  Wave Env Level 6
137     0-127   0..127                  Wave Env Time  7
138     0-127   0..127                  Wave Env Level 7
139     0-127   0..127                  Wave Env Time  8
140     0-127   0..127                  Wave Env Level 8
141     0-2     normal,single,retrigger Wave Env Trigger
142     0-1     off/on                  Wave Key On Loop
143     0-7     1..8                    Wave Key On Loop Start
144     0-7     1..8                    Wave Key On Loop End
145     0-1     off/on                  Wave Key Off Loop
146     0-7     1..8                    Wave Key Off Loop Start
147     0-7     1..8                    Wave Key Off Loop End
148     reserved
149     0-127   0..127                  Free Env Time  1
150     0-127   -64..+63                Free Env Level 1
151     0-127   0..127                  Free Env Time  2
152     0-127   -64..+63                Free Env Level 2
153     0-127   0..127                  Free Env Time  3
154     0-127   -64..+63                Free Env Level 3
155     0-127   0..127                  Free Env Release Time
156     0-127   -64..+63                Free Env Release Level
157     0-2     normal,single,retrigger Free Env Trigger
158     reserved
159     0-127   0..127  (or Notation)   LFO 1 Rate !!
160     0-5     sin,tri,sqr,saw,rnd,S&H LFO 1 Shape
161     0-127   0..127                  LFO 1 Delay
162     0-3     off/on/on/Clock         LFO 1 Sync !!
163     0-127   -64..+63                LFO 1 Symmetry
164     0-127   0..127                  LFO 1 Humanize
165     reserved
166     0-127   0..127  (or notation)   LFO 2 Rate !!
167     0-5     sin,tri,sqr,saw,rnd,S&H LFO 2 Shape
168     0-127   0..127                  LFO 2 Delay
169     0-3     off/on/on/Clock         LFO 2 Sync !!
```

```
170     0-127   -64..+63                LFO 2 Symmetry
171     0-127   0..127                  LFO 2 Humanize
172     0-127   free,3-357 degree       LFO 2 Phase
173     reserved
174     0-31    see List 3.12           Modifier Delay Source
175     0-127   0..127                  Modifier Delay Time
176     0-31    see List 3.12           Modifier 1 Source 1
177     0-31    see List 3.12           Modifier 1 Source 2
178     0-15    see List 3.14           Modifier 1 Type
179     0-127   0..127                  Modifier 1 Parameter
180     0-31    see List 3.12           Modifier 2 Source 1
181     0-31    see List 3.12           Modifier 2 Source 2
182     0-15    see List 3.14           Modifier 2 Type
183     0-127   0..127                  Modifier 2 Parameter
184     0-31    see List 3.12           Modifier 3 Source 1
185     0-31    see List 3.12           Modifier 3 Source 2
186     0-15    see List 3.14           Modifier 3 Type
187     0-127   0..127                  Modifier 3 Parameter
188     0-31    see List 3.12           Modifier 3 Source 1
189     0-31    see List 3.12           Modifier 3 Source 2
190     0-15    see List 3.14           Modifier 3 Type
191     0-127   0..127                  Modifier 3 Parameter
192     0-31    see List 3.12           Mod 1 Source
193     0-127   -64..+63                Mod 1 Amount
194     0-33    see List 3.13           Mod 1 Destination
195     0-31    see List 3.12           Mod 2 Source
196     0-127   -64..+63                Mod 2 Amount
197     0-33    see List 3.13           Mod 2 Destination
198     0-31    see List 3.12           Mod 3 Source
199     0-127   -64..+63                Mod 3 Amount
200     0-33    see List 3.13           Mod 3 Destination
201     0-31    see List 3.12           Mod 4 Source
202     0-127   -64..+63                Mod 4 Amount
203     0-33    see List 3.13           Mod 4 Destination
204     0-31    see List 3.12           Mod 5 Source
205     0-127   -64..+63                Mod 5 Amount
206     0-33    see List 3.13           Mod 5 Destination
207     0-31    see List 3.12           Mod 6 Source
208     0-127   -64..+63                Mod 6 Amount
209     0-33    see List 3.13           Mod 6 Destination
210     0-31    see List 3.12           Mod 7 Source
211     0-127   -64..+63                Mod 7 Amount
212     0-33    see List 3.13           Mod 7 Destination
213     0-31    see List 3.12           Mod 8 Source
214     0-127   -64..+63                Mod 8 Amount
215     0-33    see List 3.13           Mod 8 Destination
216     0-31    see List 3.12           Mod 9 Source
217     0-127   -64..+63                Mod 9 Amount
218     0-33    see List 3.13           Mod 9 Destination
219     0-31    see List 3.12           Mod 10 Source
220     0-127   -64..+63                Mod 10 Amount
221     0-33    see List 3.13           Mod 10 Destination
222     0-31    see List 3.12           Mod 11 Source
223     0-127   -64..+63                Mod 11 Amount
224     0-33    see List 3.13           Mod 11 Destination
225     0-31    see List 3.12           Mod 12 Source
226     0-127   -64..+63                Mod 12 Amount
227     0-33    see List 3.13           Mod 12 Destination
228     0-31    see List 3.12           Mod 13 Source
229     0-127   -64..+63                Mod 13 Amount
230     0-33    see List 3.13           Mod 13 Destination
231     0-31    see List 3.12           Mod 14 Source
232     0-127   -64..+63                Mod 14 Amount
233     0-33    see List 3.13           Mod 14 Destination
234     0-31    see List 3.12           Mod 15 Source
235     0-127   -64..+63                Mod 15 Amount
236     0-33    see List 3.13           Mod 15 Destination
237     0-31    see List 3.12           Mod 16 Source
238     0-127   -64..+63                Mod 16 Amount
239     0-33    see List 3.13           Mod 16 Destination
240     32-127  ASCII                   Name 1
241     32-127  ASCII                   Name 2
242     32-127  ASCII                   Name 3
243     32-127  ASCII                   Name 4
244     32-127  ASCII                   Name 5
245     32-127  ASCII                   Name 6
246     32-127  ASCII                   Name 7
247     32-127  ASCII                   Name 8
248     32-127  ASCII                   Name 9
249     32-127  ASCII                   Name 10
250     32-127  ASCII                   Name 11
251     32-127  ASCII                   Name 12
252     32-127  ASCII                   Name 13
253     32-127  ASCII                   Name 14
254     32-127  ASCII                   Name 15
255     32-127  ASCII                   Name 16
*************************************************************************
```

```
3.11 Play Parameters                              3.12 Modulation Sources
**************************************************  **************************************************
Value   Index           Parameter
--------------------------------------------------  Index                Modulation Source
0       1               Osc 1 Octave               --------------------------------------------------
1       2               Osc 1 Semitone             0                    off
2       3               Osc 1 Detune               1                    LFO1
3       5               Osc 1 Pitchbend            2                    LFO1 * Modwheel
4       6               Osc 1 Keytrack             3                    LFO1 * Aftertouch
5       12              Osc 2 Octave               4                    LFO2
6       13              Osc 2 Semitone             5                    Filter Envelope
7       14              Osc 2 Detune               6                    Amplifier Envelope
8       17              Osc 2 Pitchbend            7                    Wave Envelope
9       18              Osc 2 Keytrack             8                    Free Envelope
Wavetable10    25            44                     9                    Key Follow
11      26              Wave 1 Startwave           10                   Keytrack
12      27              Wave 1 Phase               11                   Velocity
13      28              Wave 1 Env Amount          12                   Release Velocity
14      29              Wave 1 Velo Amount         13                   Aftertouch
15      30              Wave 1 Keytrack            14                   Poly Pressure
16      36              Wave 2 Startwave           15                   Pitch Bend
17      37              Wave 2 Phase               16                   Modwheel
18      38              Wave 2 Env Amount          17                   Sustain Control
19      39              Wave 2 Velo Amount         18                   Foot Control
20      40              Wave 2 Keytrack            19                   Breath Control
21      47              Mix Wave 1                 20                   Control W
22      48              Mix Wave 2                 21                   Control X
23      49              Mix Ringmod                22                   Control Y
24      50              Mix Noise                  23                   Control Z
25      53              Aliasing                   24                   Control Delay
26      54              Quantize                   25                   Modofier #1
27      55              Clipping                   26                   Modofier #2
28      62              Filter 1 Cutoff            27                   Modofier #3
29      63              Filter 1 Resonance         28                   Modofier #4
30      64              Filter 1 Type              29                   MIDI Clock
31      65              Filter 1 Keytrack          30                   minimum
32      66              Filter 1 Env Amount        31                   Maximum
33      67              Filter 1 Velo Amount       --------------------------------------------------
34      73              Filter 2 Cutoff            **************************************************
35      74              Filter 2 Type
36      75              Filter 2 Keytrack          3.13 Modulation Destinations
37      77              Sound Volume               **************************************************
38      79              Amp Envelope Velo Amount
39      80              Amplifier Keytrack         Index                Modulation Destination
40      81              Chorus                     --------------------------------------------------
41      84              Panning                    0                    Pitch
42      85              Pan Keytrack               1                    Osc 1 Pitch
43      87              Glide on/off               2                    Osc 2 Pitch
44      88              Glide Type                 3                    Wave 1 Pos
45      92              Arpeggiator on/off/hold    4                    Wave 2 Pos
46      93              Arp Tempo                  5                    Mix Wave 1
47      94              Arp Clock                  6                    Mix Wave 2
48      95              Arp Range                  7                    Mix Ringmod
49      96              Arp Pattern                8                    Mix Noise
50      97              Arp Direction              9                    Filter 1 Cutoff
51      98              Arp Note Order             10                   Filter 1 Resonance
52      99              Arp Velocity               11                   Filter 2 Cutoff
53      108             Allocation                 12                   Volume
54      109             Assignment                 13                   Panning
55      113             Filter Env Attack          14                   Filter Env Attack
56      114             Filter Env Decay           15                   Filter Env Decay
57      115             Filter Env Sustain         16                   Filter Env Sustain
58      116             Filter Env Release         17                   Filter Env Release
59      119             Amlifier Env Attack        18                   Amlifier Env Attack
60      120             Amlifier Env Decay         19                   Amlifier Env Decay
61      121             Amplifier Env Sustain      20                   Amplifier Env Sustain
62      122             Amplifier Env Release      21                   Amplifier Env Release
63      159             LFO1 Rate                  22                   Wave Envelope Times
64      160             LFO1 Shape                 23                   Wave Envelope Levels
65      161             LFO1 Delay                 24                   Free Envelope Times
66      162             LFO1 Sync                  25                   Free Envelope Levels
67      163             LFO1 Symmetry              26                   LFO1 Rate
68      164             LFO1 Humanize              27                   LFO1 Level
69      166             LFO2 Rate                  28                   LFO2 Rate
70      167             LFO2 Shape                 29                   LFO2 Level
71      168             LFO2 Delay                 30                   Mod #1 Amount
72      169             LFO2 Sync                  31                   Mod #2 Amount
73      170             LFO2 Symmetry              32                   Mod #3 Amount
74      171             LFO2 Humanize              33                   Mod #4 Amount
75      172             LFO2 Phase                 34                   FM Amount
76      7               Osc 1 FM Amount !!         35                   F1 Extra (Wave/BP offset/
77      70              Filter 1 Special !!                             Osc2 FM/S&H Rate)
78      90              Glide Time !!
79      --              Control W !!               --------------------------------------------------
80      --              Control X !!               **************************************************
81      --              Control Y !!
82      --              Control Z !!
--------------------------------------------------
**************************************************
```

```
3.14 Modifiers
******************************************************************************


Index    Operand        Operation
------------------------------------------------------------------------------
0        +              Addition
1        -              Subtraction
2        *              Multiplication
3        /              Division
4        XOR            Bitwise exclusive-or
5        OR             Bitwise inclusive-or
6        AND            Bitwise and
7        S&H            Sample & Hold
8                       Ramp
9                       Switch
10                      Abs value
11                      Min value
12                      Max value
13                      Lag processor
14                      Control filter
15                      Differentiator
------------------------------------------------------------------------------
******************************************************************************


3.15 Filter 1 Types
******************************************************************************


Index                   Filter Type
------------------------------------------------------------------------------
0                       24 dB Lowpass
1                       12 dB Lowpass
2                       24 dB Bandpass
3                       12 dB Bandpass
4                       12 dB Highpass
5                       Sine Waveshaper followed by 12 dB Lowpass
6                       12 db Lowpass followed by Waveshaper !!
7                       Dual 12 dB Low/Bandpass parallel !!
8                       12 db Lowpass FM-Filter !!
9                       12 db Lowpass with Sample & Hold !!


------------------------------------------------------------------------------
******************************************************************************



3.2 MDATA - Multi Data
******************************************************************************



Index    Range   Value               Parameter
------------------------------------------------------------------------------
0        0-127   0..127              Multi Volume
1        0-121   0..120,global       Control W
2        0-121   0..120,global       Control X
3        0-121   0..120,global       Control Y
4        0-121   0..120,global       Control Z
5        1-127   extern,50..300 BpM  Arpeggiator Tempo

6        reserved
7        reserved
8        reserved
9        reserved
10       reserved
11       reserved
12       reserved
13       reserved
14       reserved
15       reserved
16       32-127  ASCII               Name 1
17       32-127  ASCII               Name 2
18       32-127  ASCII               Name 3
19       32-127  ASCII               Name 4
20       32-127  ASCII               Name 5
21       32-127  ASCII               Name 6
22       32-127  ASCII               Name 7
23       32-127  ASCII               Name 8
24       32-127  ASCII               Name 9
25       32-127  ASCII               Name 10
26       32-127  ASCII               Name 11
27       32-127  ASCII               Name 12
28       32-127  ASCII               Name 13
29       32-127  ASCII               Name 14
30       32-127  ASCII               Name 15
31       32-127  ASCII               Name 16
******************************************************************************
```

```
3.3 IDATA - Instrument Data
****************************************************************************
Index   Range   Value                   Parameter
--------------------------------------------------------------------------
0       0-1     A/B                     Sound Bank
1       0-127   1..128                  Sound Number
2       0-17    global,omni,1-16        MIDI Channel
3       0-127   0..127                  Volume
4       16-112  -48..+48                Transpose
5       0-127   -64..+63                Detune
6       0-1     Main Out/Sub Out        Output
7       0-1     off/on                  Status
8       0-127   left64..center..right63 Panning
9       0-2     off/on/inverse          Pan Mod
10      reserved
11      reserved
12      1-127   1..127                  Lowest Velocity
13      1-127   1..127                  Highest Velocity
14      0-127   0..127                  Lowest Key
15      0-127   0..127                  Highest Key
16      0-2     off,on,hold,Sound Arp   Arpeggiator Active
17      0-15    1/1..1/32               Arpeggiator Clock
18      1-10    1..10                   Arpeggiator Range
19      0..16   off,user,1..15          Arpeggiator Pattern
20      0-3     up,down,alt,random      Arpeggiator Direction
21      0-3     note,n.rev,played,p.rev Arpeggiator Note Order
22      0-1     root note/last note     Arpeggiator Velocity
23      0-1     off/on                  Arpeggiator Reset on Pattern Start
24      0-18    off/Ch1-16/Inst/global  Arpeggiator Notes out !!
25      reserved
26      reserved
27      reserved
****************************************************************************
3.4 WDATA - Wave Data
****************************************************************************
A Wave consists of 128 eight Bit samples, but only the first 64 of them are
stored/transmitted, the second half is same as first except the values are
negated and the order is reversed:

Wave[64+n] = -Wave[63-n]        for n=0..63

Not that samples are not two's complement format, to get a signed byte,
the most significant bit must be flipped:
signed char s = Wave[n]^0x80;

Index   Range   Value                   Parameter
--------------------------------------------------------------------------
0       0-15    00h..F0h                Sample 1, most significant nibble
1       0-15    00h..0Fh                Sample 1, least significant nibble
2       0-15    00h..F0h                Sample 2, most significant nibble
3       0-15    00h..0Fh                Sample 2, least significant nibble
4       0-15    00h..F0h                Sample 3, most significant nibble
5       0-15    00h..0Fh                Sample 3, least significant nibble
[...]
126     0-15    00h..F0h                Sample 64, most significant nibble
127     0-15    00h..0Fh                Sample 64, least significant nibble
****************************************************************************
3.5 WCTDATA - Wave Control table Data
****************************************************************************
A Wave control table consists of 64 entries that indicate a wave
for the specific position. If the index is not valid, the position
will be filled with a spectral interpolation of the neighbour waves.
The last three Waves will always be triangle, square and sawtooth,
and the first index must be valid. Valid indices are currently:

0-200           for ROM Waves 0 to 299,
1000-1249       for User Waves 1000 to 1249

Index   Range   Value                   Parameter
--------------------------------------------------------------------------
0       0-15    0000h..F000h            Index 1, most significant nibble, upper half
1       0-15    0000h..0F00h            Index 1, least significant nibble, upper half
2       0-15    0000h..00F0h            Index 1, most significant nibble, lower half
3       0-15    0000h..000Fh            Index 1, least significant nibble, lower half
4       0-15    0000h..F000h            Index 2, most significant nibble, upper half
5       0-15    0000h..0F00h            Index 2, least significant nibble, upper half
6       0-15    0000h..00F0h            Index 2, most significant nibble, lower half
7       0-15    0000h..000Fh            Index 2, least significant nibble, lower half

[...]

252     0-15    0000h..F000h            Index 64, most significant nibble, upper half
253     0-15    0000h..0F00h            Index 64, least significant nibble, upper half
254     0-15    0000h..00F0h            Index 64, most significant nibble, lower half
255     0-15    0000h..000Fh            Index 64, least significant nibble, lower half


****************************************************************************
```

```
3.6 GDATA - Global Parameters
*******************************************************************************


Note: Global Parameters are very unordered.

Index   Range   Value                   Parameter
-------------------------------------------------------------------------------
0       reserved
1       0-2     A,B,Multi               Startup Soundbank or 2:Multi Mode
2       0-127   1..128                  Startup Sound Number
3       1-17    omni,1-16               MIDI Channel
4       0-2     sound,multi,combined    Program Change Mode
5       0-126   0..126                  Device ID  DEV
6       0-121   0..120,harmonic         Bend Range
7       0-120   0..120                  Controller W
8       0-120   0..120                  Controller X
9       0-120   0..120                  Controller Y
10      0-120   0..120                  Controller Z
11      0-127   0..127                  Main Volume
12      reserved
13      reserved
14      52-76   -12..+12                Transpose
15      54..74  430Hz..450Hz            Master Tune
16      0-127   0..127                  Display Timeout
17      0-127   0..127                  LCD Contrast
18      reserved
19      reserved
20      reserved
21      reserved
22      0-127   1..128                  Startup Multi Number
23      o-16    off/Chnl1-16            Arpeggiator Note out Channel !!
24      0-1     off/on                  MIDI Clock output
25      0-3     off/Ctl/SysEx/Ctl+SysEx Parameter send
26      0-1     off/on                  Parameter receive
27      0-3     1..4                    Input Gain [XT only] !!
28      reserved
29      reserved
30      reserved
31      reserved
*******************************************************************************



*******************************************************************************

4.) Device Inquiry

The Microwave 2 responds to the Universal Device Inquiry message
F0,7E,<channel>,06,01,F7 if <channel> is set to 7F or if <channel>
matches the specific Device ID. The Microwave 2 will respond with
the following:

        F0,7E,06,02             Universal Device Header
        3E,                     Waldorf Electronics Manufacturer ID
        0E,00,                  Device family code : Microwave 2
        XX,YY,                  Device family member code, see below
        VV,VV,VV,VV,            Software revision, ASCII, e.g. "2.09"
        F7                      EOX

Device family member codes (XX,YY):

        00,00                   Microwave 2
        01,00                   Microwave 2 with XT Mainboard (has Delay Effects !)
        03,00                   Microwave XT
        05,00                   Microwave PC on Terratec EWS Frontmodule
*******************************************************************************
```

```
2.82   INFR
**********************************************************************
INFR   07h     Information Request

This only works for Microwave PC on Terratec EWS Frontmodule !

The full format of a INFR Dump is:

Index   Label   Value         Description
-----------------------------------------------------------
0       EXC     F0h           Marks Start of SysEx
1       IDW     3Eh           Waldorf Electronics GmbH ID
2       IDE     0Eh           Microwave 2 ID
3       DEV                   Device ID
4       IDM     08h           here INFR
5       Typ     xx            Typ of information
6       EOX     F7h           End of SysEx
-----------------------------------------------------------
**********************************************************************

2.83 INFD
**********************************************************************
INFD   18h     Information Dump

The full format of a INFD Dump is:

Index   Label   Value         Description
-----------------------------------------------------------
0       EXC     F0h           Marks Start of SysEx
1       IDW     3Eh           Waldorf Electronics GmbH ID
2       IDE     0Eh           Microwave 2 ID
3       DEV                   Device ID
4       IDM     18h           here INFD
5       Typ     xx            Typ of Information give
6...            ii...         Information specific
6+N     EOX     F7h           End of SysEx
-----------------------------------------------------------
**********************************************************************

Information types

xx      Information    N   ii
-----------------------------------------------------------
00:     Sampling rate  1   0: 32000 1:40000 2:44100 3:48000
01:     Routing        3   out1,out2,out3 :triple output assignments bitvectors
02:  MIDI Switches1    bit 0: Serial MIDI in on/off 1: IIC MIDI in 2: IIC MIDI out
03:  Ext In Select1    0: Digital input 1 1:Digital input2 (Dream 9407)

Output assignments:
out1 (ESSI0 TX0)      Bit 3          Bit 2          Bit 1          Bit 0
(digital out 1)       In1            In2 / 9407     MW Main        MW Sub
                      (ESSI0 Rx)     (ESSI1 RX)

out2 (ESSI1 TX0)      Bit 3          Bit 2          Bit 1          Bit 0
(digital out 2)       In1            In2            MW Main        MW Sub
                      (ESSI0 Rx)     (ESSI1 RX)

out3 (ESSI1 TX1)      Bit 3          Bit 2          Bit 1          Bit 0
(Dream Input)         In1            In2            MW Main        MW Sub
                      (ESSI0 Rx)     (ESSI1 RX)

So a complete routing dump is
F0,3E,0E,DEV,18,1,out1,out2,out3,F7

Default routing:
out1 = 0Fh
out2 = 0Fh
out3 = 0Fh
That is all signals to all outputs.


MIDI Switches:
0: off , else on

So a complete MIDi Switch dump is
F0,3E,0E,DEV,18,2,MM,F7

Default switching:
MM = 7, That is all in-/outputs on
MIDI IIC in is currently ignored to ensure all others can be turned on again.
```

MIDI IMPLEMENTATION CHART

Date: 8/10/1998

Model: TerraTec digitalXtension microWAVE PCVersion: 1.0

Function		Transmitted	Recognized	Remarks
Basic	Default	X	1	
Channel	Changed	X	1 -16	
	Default	X	X	
Mode	Messages	X	X	
	Altered	X	X	
Note		X	0 - 127	
Number	True Voice	X	0 - 127	
Velocity	Note On	X	o	
	Note Off	X	X	
After	Key's	X	o	
Touch	Ch's	X	o	
Pitch Bender		X	o	
	1	X	o	Modwheel
	2	X	o	Breath Control
Control	5	X	o	Portamento Time
Change*	7	X	o	Master Volume
	10	X	o	Panning
	32	X	o	Bank Select
	64	X	o	Sustain Pedal
Prog		x	o	
Change	True #	X	0 - 127	
System Exclusive		o	o	
System	: Song Pos	X	o	
	: Song Sel	X	X	
Common	: Tune	X	X	
System	: Clock	X	o	Start, Stop,
Real Time	: Commands	X	o	Continue
AUX	: Local ON/OFF	X	X	
Mes-	: All Notes Off	X	o	
sages	: Active Sense	X	o	
	: Reset	X	X	
*Note: See MIDI Controller Assignments for more information.				

Mode 1: OMNI ON, POLYMode 2: OMNI ON, MONOo : Yes

Mode 3: OMNI OFF, POLYMode 4: OMNI OFF, MONOx : No