rocket
SYNTHESIZER
User Manual
English

waldorf

Foreword

Thank you for purchasing the Waldorf Rocket synthesizer. You now own a very compact analog synthesizer with an extraordinary look and astonishing sound. We know that already and you will know soon too. You have our word!

What to read?

The biggest problem with any manual is to find a way to cover both the needs of an absolute expert and a beginner alike. There are people who read a manual cover to cover while others don't even touch it. The latter is the worst choice, especially when the manual describes a Waldorf instrument.

If you do decide to read the following manual we can promise you a lot of fun while reading it and especially afterwards working with the Waldorf Rocket.

Your Waldorf-team

Hint

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Revision:	1.0, February 2013

Please visit our website **www.waldorfmusic.de** It is possible a newer operating system is available as a download for your Rocket.

We would like to thank

Willie Eckl, Joachim Flor, Michael von Garnier, Erik Heirman, Frédéric Meslin, Kurt "Lu" Wangard, 吴海彬, and anyone we have forgotten.
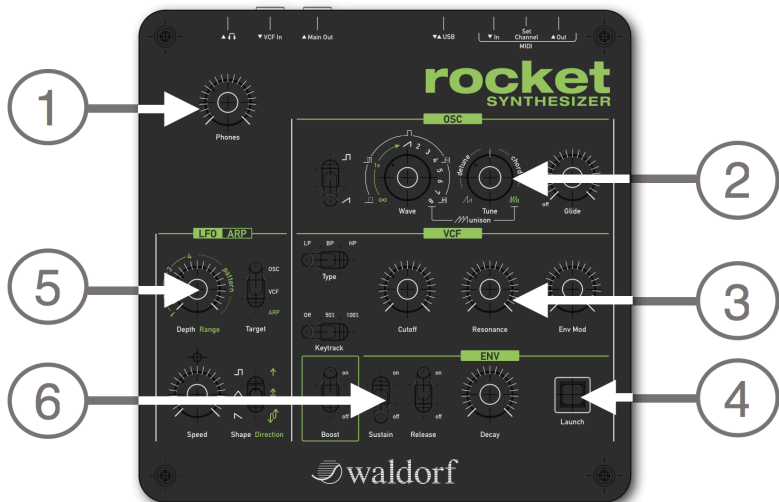
Content

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Control Features and Connections

Front Panel

① Headphone Volume Dial

② Oscillator Controls

③ Filter Controls

④ Launch Button/ MIDI Input Indicator

⑤ LFO/ Arpeggiator Controls

⑥ Envelope Controls

Connections
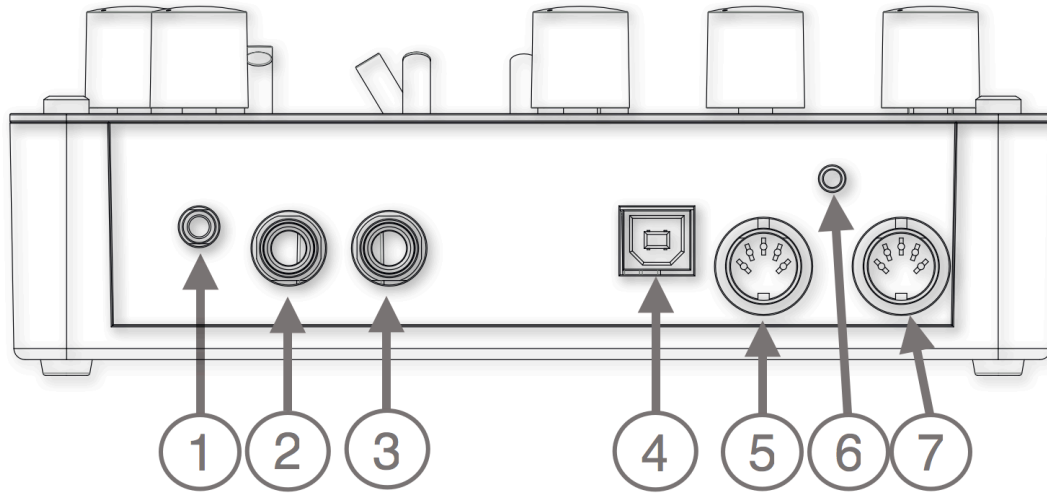
❶ Stereo Headphone Jack

❷ Audio Line Input (Mono Jack)

❸ Audio Line Output (Mono Jack)

❹ USB Port for power supply and connection to a suited computer

❺ MIDI In Jack

❻ MIDI Channel Selection Button

❼ MIDI Out Jack

Introduction

About this Manual

This manual was written to help you become familiar with the Rocket synthesizer. It will also aid experienced users with routine tasks.

To avoid confusion, the terminology in this manual is based on the Rocket parameter names. You will find a glossary at the end of this manual; it explains the various terms used.

Important terms are highlighted in bold letters.

Symbols

⚠ **Caution – The comments that follow this symbol will help you avoid errors and malfunctions.**

ℹ️ Info – Additional information on a given topic.

☞ **Instruction – Follow these guidelines to execute a desired function.**

✳ **Example –** Real-world examples to try out.

Highlighted Control Features and Parameters

All of the Rocket´s buttons, controls and parameters are highlighted in **bold** letters throughout the manual.

Example:

• Press the **Launch** button.

• Move the **Cutoff** knob.

The Rocket's different modes and parameter pages are illustrated in a depiction of the display.

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General Safety Guidelines

⚠️ **Please read the following safety tips carefully! They include several precautions you should always observe when dealing with electronic equipment. Read all of the instructions before operating your device**

Suitable Operating Conditions

- Use the device indoors only. Outside it could be rainy or humid as well as too hot or too cold.

- Never use the device under damp conditions such as in bathrooms, washrooms or around indoor swimming pools.

- Do not use the device in extremely dusty or dirty environments in order maintain the surface finishing of the Rocket.

- Make sure that adequate ventilation is available on all sides of the device. Do not place the device near heat sources such as radiators.

- Do not expose the device to direct sunlight, even if you have a suitable sunscreen.

- Do not expose the device to extreme vibrations.

Power Supply

- Please only use the included USB power supply.

- Unplug the device when you are not using it for longer periods.

- Always pull the plug when unplugging the device, never the cable.

Operation

- Never place objects containing liquids on or near the device.

- Always place the device on a stable base only.

- Make sure no foreign objects find their way into the chassis. If for some reason this should occur, switch the power off, unplug the device and consult a qualified repair center.

- This device, used on its own or with amplifiers, speakers or headphones, can generate volume levels that may result in irreparable damage to your hearing and/or speakers and amplifiers. For this reason you should keep the volume at appropriate levels at all times.

Maintenance

- Do not open the device or remove the cover. Refer all service and repair tasks to qualified personnel. There are no user serviceable parts inside the chassis.

- Use only a dry, soft cloth or brush to clean the device. Never use alcohol, cleaning solutions or similar chemicals. They will damage the surface of the chassis.

Proper Use

This device is designed exclusively to produce low-frequency audio signals for the purpose of generating sound. Any other use is prohibited and voids the warranty extended by Waldorf Music. Waldorf Music is not liable for damages due to incorrect use.

⚠️ **Do not leave your Rocket near children, mothers-in-law or pets. This could lead to critical interactions.**

Setup and Connection

Package Contents

The Waldorf Rocket package comes complete with:

- the Waldorf Rocket Synthesizer

- an external USB power supply as well as an USB cable

- a CD-ROM with the complete PDF manual and other tools

> **i** You own a computer without a CD drive? Don´t worry, you can download all necessary data here: **www.waldorfmusic.de**

Please ensure all the items above are included. If something is missing, contact your local dealer.

We recommend that you keep the original packing material for future transport.

Connections

In order to get started with your Rocket you will need an AC power outlet or a suitable computer with an USB port. For the connection of the audio output you will need either a mixing console or an audio interface. You can also use a suitable headphone. Last but not least you will mostl likely need a MIDI master keyboard.

You can also use a computer or hardware sequencer to make use of the Rocket's MIDI features.

☞ **To connect the devices:**

1. Turn all units off.

2. Connect the Rocket´s audio output ❸ to your mixing console or your computer audio interface. Optionally connect a suited stereo headphone to the Rocket´s headphone output ❶ .

3. To play the Rocket you need a MIDI master keyboard. Connect its MIDI Out jack to the Rocket´s MIDI input ❺.

4. If you want to use a computer with a MIDI interface, connect your interface´s MIDI Out jack to the Rocket´s MIDI In jack ❺.

5. Optionally you can connect the Rockets´s USB port ❹ with a USB cable to your computer. After that the Rocket is automatically available as a MIDI unit and will also receive power via the USB connection.

6. Without a computer, you need to connect the USB power supply that came with the Rocket to the USB port ❹ of the Rocket. After that, the Rocket is ready for work!

7. If you want to use the external filter input, please connect it ❷ to a line output of your signal source.

8. Then switch on the computer (if connected), the mixing console and finally the amplifier or active monitor speakers.

🛈 To check the correct reception of MIDI data send any MIDI event to the Rocket; the Launch button LED ② will light up on any incoming MIDI message. If this is not the case please check the MIDI connection to the Rocket. By default, the Rocket will receive MIDI data on MIDI channel 1.

🛈 If you do not choose to connect a mixing console, you can patch the Rocket's output signals directly to an amp or an audio interface. Use an input usually called Line, Aux or Tape input

⚠ **Before connecting and disconnecting the Rocket to a power supply source, turn your amp's volume control all the way down to avoid damage due to on/off switching noise. The Rocket produces a high level output signal. Please take care that the connected playback device is suitable for the high level of an electronic instrument. Never use the mic or phono input of the connected amp!**

The USB Connection

Using a USB cable you can connect the Rocket to your computer observing the following system requirements:

- Windows PC: Windows XP or newer is recommended, a USB port

- Linux PC, a USB port

- Apple: Intel Mac with Mac OS X 10.5 or newer, a USB port

The USB connection of the Rocket allows

- Power supply via USB without using an additional power supply when connected to a suitable computer

- Power supply via the USB power supply

- transmitting and receiving MIDI data

- dumping of firmware updates to the Rocket

- data exchange with suitable computer software

> **ℹ** Make sure to use a suited computer USB port as well as a USB suited cable to avoid problems with data transmission.

> **ℹ** Keep also in mind that we offer new firmware updates from time to time. Please read also the chapter "Updating the Firmware".

Basic Operation

Switching on/ off

The Rocket is ready-to-operate after the connection to the USB power supply or via USB cable to a suitable computer.

System Volume

What do you know? The **Headphone Volume knob** ① controls the Rocket's headphone volume The main audio output always delivers a line level signal.

Where are the Presets?

Presets are absent by design. Because of the very clear parameters we can assure you that you will be able to set an universe of sounds within seconds.

> ℹ️ Take a look at page 24 of this manual. Here you will learn how to save sound parameters to your computer.

Editing Parameters

In order to edit a sound, you must access the appropriate parameters. In spite of the Rocket's compactness it uses a sophisticated user interface allowing fast editing of any parameter.

Turning a dial clockwise increases the corresponding value; turning it counterclockwise decreases it. Unbelievable! Switching a switch does exactly switch this switch. Keep in mind, that some switches offers more than two states.

The Launch Button

A short tip on the Launch button sends out MIDI note C3 (MIDI note number 60). You can even use this button, if no MIDI master keyboard is connected.

> ℹ️ The Launch button memorizes the last note received via MIDI and will use it for further triggering until a new MIDI note arrives.

Incoming MIDI data is indicated by blinking of the Launch LED.

> ℹ️ Another function of the Launch button will be explained on page 24 of this manual.

Sound Parameters

Overview of Functions

The Waldorf Rocket consists of numerous sound-shaping components

> ℹ️ Is the Rocket your first synthesizer? Are you curious about sound synthesis? If so, we recommend to read the chapter "Sound Synthesis Basics" in this manual.

You should know that the Rocket consists of two different types of components for sound generation and sound shaping:

- Sound synthesis: Oscillator, Filter, Amplifier with saturation: These modules represent the audio signal flow. Sound generation actually occurs within the Oscillator. It produces square and sawtooth waves. The Filter then shapes the sound by amplifying (boosting) or attenuating (dampening) certain frequencies. The Amplifier is located at the end of the signal chain. It determines the overall volume of the signal and can add some saturation.

- Modulators: The Modulators are designed to manipulate or modulate the sound generating components to add dynamics to the sound. The Low-frequency Oscillator (LFO) is designed for periodic or recurring modulations while the Envelope is normally used for modulations that occur once.

Oscillator Section

It looks like the Rocket offers only a single oscillator. But there is more to know and more to hear.
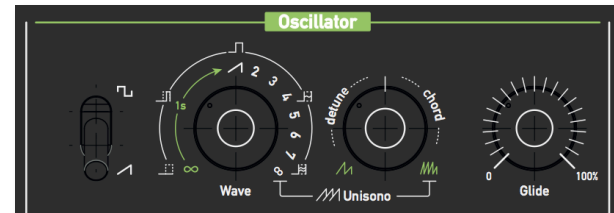
> ℹ️ A detailled introduction to oscillators can be found in the chapter "Sound Synthesis Basics".

The Osc Switch   *Sawtooth/ Pulse*

Sets the type of waveform generated by the Oscillator:

- *Pulse* selects the pulse waveform. A Pulse waveform with a pulsewidth of 50% has only the odd harmonics of the fundamental frequency present. This waveform produces a hollow/ metallic sound.

- *Saw* selects the sawtooth waveform. A Sawtooth wave has all the harmonics of the fundamental frequency in descending magnitude.

Wave   *diverse functions*

This parameter offers different functions based on the selected value.

- If *Sawtooth* is selected: Within the range from 0 to 63 you can control the Sync envelope time from infinity (∞) to quite short values.

- If *Sawtooth* is selected: Within the range from 64 to 127 you can add up to seven sawtooth waves to your basic sawtooth sound. This feature is for fat poly saw cluster sounds.

- If *Pulse* is selected: The leftmost setting (value 0) deactivates the oscillator. Why that? If you want to

hear an external audio signal only, you need to switch off the oscillator signal.

- If *Pulse* is selected: Within the range from 1 to 63 you can control the pulsewidth of the Pulse oscillator from an needle impulse up to a square wave (50% pulsewidth).

- If *Pulse* is selected: Within the range from 64 to 127 you can modulate the pulsewidth through the LFO: The higher the values, the stronger the modulation intensity.

Tune   *diverse functions*

This parameter offers different functions based on the selected value:

- If *Sawtooth* is selected and the Oscillator sync mode is active (**Wave** has to be set between 0 and 63): Within the range of 0 to 63 you can control the pitch for the synchronization start.

- If *Sawtooth* is selected and the poly saw mode is active (**Wave** has to be set between 64 and 127): Within the range of 0 to 63 you can control the amount of detune of the poly saw oscillator in cents. Within the range of 64 to 127 you can con-

trol the pitch of the poly saw oscillator in a musical range.

- Special case: If *Sawtooth* is selected and the poly saw mode is active with a maximum value of the **Wave** parameter: With maximum setting of the **Tune** parameter you will get an unisono mode where all 8 oscillators will play the incoming MIDI notes. This is no real polyphony but will allow playing chords.

- If *Pulse* is selected: Within the range from 0 to 63 you can control the detune of the pulse oscillator in cents. Within the range of 64 to 127 you can control the pitch of the pulse oscillator in a musical range.

> **i** Pitch Bend uses a value range of +/- 12 semitones.

Glide

"Glide" or "Portamento" describes the continuous gliding from one note to another. This effect can be created on fretless stringed instruments or some brass instruments. It is very common on synthesizers and used throughout all music styles. Please note that Glide only works, if you play the Rocket legato.

> **i** Dear friend of electronic club music: Use Glide to produce a typical pitch bass and pitch lead sound.

Glide determines the glide time. Low values will give a short glide time in a range of milliseconds that gives a special character to the sound. High values will result in a long glide time of up to several seconds which can be useful for solo and effect sounds. In the leftmost setting, the Glide function is deactivated.

> **i** If the Arpeggiator is selected, Glide is always active.

Filter Section
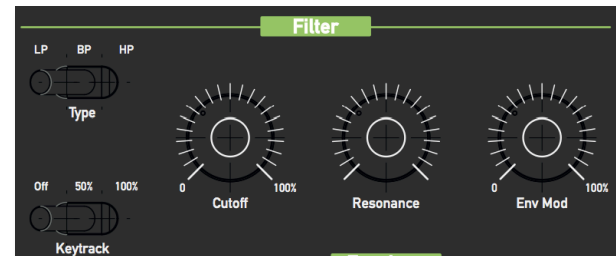
The Rocket offers a multimode filter.

ℹ️ A detailed introduction of the filters can be found in the chapter "Sound Synthesis Basics" of this manual.

Type   *LP / BP / HP*

Selects the filter type:

*   The *LP Lowpass* removes frequencies above the cutoff point.

*   The *BP Bandpass* removes frequencies both below and above the cutoff point. As a result, the sound character gets thinner. Use these filter types when programming effect and percussion-like sounds

*   The *HP Highpass* is useful to thin out a sound's bass frequencies. It removes frequencies below the cutoff point.

Keytrack   *Off / 50% / 100%*

Determines how much the cutoff frequency depends on the MIDI note number. The reference note for Keytrack is C3, note number 60.

Cutoff

Controls the cutoff frequency for the lowpass and high-pass filter type and the center frequency for the band pass.

*   When the lowpass type is selected via the **Type** switch, all frequencies above the cutoff frequency are damped.

*   When the highpass type is selected, all frequencies below the cutoff frequency are damped.

*   When the bandpass type is selected, only frequencies near the cutoff setting will be passed through.

You can bring more movement into the sound by modulating the cutoff frequency via the LFO, the envelope or the **Keytrack** parameter of the filter. At center position (100% Keytracking) and maximum **Resonance** level, the then self-oscillating filter can be played in a tempered scale.

Resonance

Controls the emphasis of the frequencies around the cutoff point. Use lower values to give more brilliance to a sound. At higher values a sound gets the typical filter

character with a strong boost around the cutoff frequency. When the setting is raised to maximum, the filter starts to self-oscillate, generating a pure sine wave. This feature can be used to create analog-style effects and percussion, like electronic toms, kicks, zaps etc.

### Env Amount   *0...100%*

(= Envelope Amount). Determines the amount of influence the envelope has on the cutoff frequency. For higher settings, the filter cutoff frequency is increased by the modulation of the envelope. Use this parameter to change the timbre of the sound over time. Sounds with a hard attack usually have a envelope amount that makes the start phase bright and then closes the filter to get a darker sustain phase.

By the way, the envelope amount also depends on the played velocity. Use this feature to give a more expressive character to the sound. When you hit the keys smoothly, only minimal modulation is applied. When you hit them harder, the modulation amount also gets stronger.

> **ℹ** If you want to process an external audio signal by the Rocket´s filter, you should set the **OSC** switch to *Pulse* and the **Wave** knob to minimum.

Envelope Section (ENV)
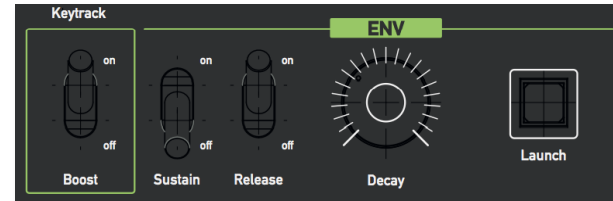
The Rocket offers two envelopes for filter and volume. Both envelopers are using the same Decay and Release settings. The filter envelope is using Decay/ Release without a Sustain phase while the amplifier envelope offers a switch for Sustain. Both envelopes are working with a retrigger mode.

Boost   *on / off*

Adds saturation to the signal. If set to *off*, no saturation will be added or, in other words, the signal will remain clean. If set to *on,* harmonics will be added to the signal, resulting in a warm distorted character, suitable for harder lead sounds and effects. For your information: The saturation stage is located behind the filter module.

✳ Boost is well suited for sounds that use some fil-
ter resonance.

The Sustain Switch   *on / off*

Activates the sustain that will be held until the note is
released. Sustain is always 100%.

The Release Switch   *on / off*

Once the note has ended, the release phase begins.
During this phase, the envelope fades to zero at the rate
determined by the **Decay** value.

Decay   *10 ms...10 s*

Determines the decay rate or amount of time it takes for
a signal to reach the **Sustain** level.

ℹ️ Switch **Sustain** and **Release** to *on*, to set the
envelope mode to "Single Trigger". This means,
that the envelopes behave like a single envelope.
This common envelope starts as soon as the first
note is played. It stays at sustain level until the
last note is released. Afterwards the release phase
is active.

The Launch Button

More about this button can be found in the chapter "Ba-
sic Operation".

LFO/ ARP Section

In addition to the main oscillator, the Rocket is equipped
with a low frequency oscillator (LFO) that can be used
for modulation purposes. The LFO generates a periodic
waveform with adjustable frequency and shape. Alterna-
tively this section offers an Arpeggiator that splits inco-
ming MIDI chords into its single notes and repeats them
rhythmically.

ℹ️ Hint: The Modulation Wheel of your MIDI master
keyboard can be used to control the vibrato inten-
sity with an additional internal LFO.
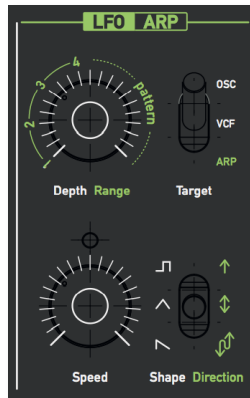
The Target Switch   *OSC / VCF /ARP*

Determines the modulation destination for the LFO. Also activates the Arpeggiator.

- *OSC* selects oscillator pitch as the destination for the LFO modulation. The Arpeggiator is automatically deactivated in this setting.

- *VCF* selects the filter cutoff as the destination for the LFO modulation. The Arpeggiator is automatically deactivated in this setting.

- *ARP* activates the Arpeggiator. The LFO is automatically deactivated in this setting.

> **i** If the Arpeggiator is selected, Glide is always active.

> **i** Aftertouch (if your MIDI master keyboard is able to send this data) is always routed to filter cutoff.

Depth/ Range   *Diverse*

This knob offers two modes depending on whether LFO or Arpeggiator is active.

When LFO is active, the knob controls the modulation depth for the selected LFO modulation. The basic principle: The higher the values, the more intensive the LFO modulation.

> **i** Exception: If oscillator pitch is modulated, values between 64 and 127 will vary the modulation depth in semitones.

When ARP mode is active, you can set the range of notes in octaves with values from 0 to 63. You can select up to 4 octaves. When it is set to *1 Octave*, the note list will be played back in the same octave as original. Higher valu-

es mean that the note list is repeated in higher or lower octaves.

The range from 64 to 127 offers 15 ROM rhythm patterns.

The Shape/ Direction Switch   *Square / Triangle / Sawtooth / Diverse*

This switch offers two modes depending on whether LFO or Arpeggiator is active.

If LFO is selected, the switch determines the LFO waveform:

*   The *Square* shape can be interesting for hard changes and special effects.

*   The *Triangle* shape is perfect for smooth pitch or filter modulations.

*   The *Saw* (downwards) shape can generate interesting filter changes.

> For your information: Oscillator pitch modulation by the LFO Square shape is unipolar. It oscillates in only one direction.

When ARP is selected, the switch determines the direction that is used to play back the arpeggio:

*   If *Up –* is selected, the note list is played forward and the octaves are transposed upward. The arpeggio starts in the original octave and goes up to the highest octave. Then the arpeggio is repeated.

*   If *Alternate* is selected, the note list is first played backward and the octaves are transposed downward. The arpeggio starts in the highest octave. After reaching the first note of the note list in the original octave, the note list is played forward and the octaves are transposed upward up to the last note of the note list in the highest octave to play. Then the arpeggio is repeated.

*   If *Random* is selected, the note list is played randomly.

Speed

This knob offers two modes depending on whether LFO or Arpeggiator is active.

In LFO mode: **Speed** determines the frequency of the LFO. At low values, it might take several minutes for the LFO to perform a complete cycle while higher values are

up to the audible range (from 0.01 Hz to 100 Hz). When MIDI clock is received, you can adjust **Speed** in musical values (e.g. 1 bar) in reference to the frequency.

When Speed is turned fully counter-clockwise, the LFO stops and each note generates a random output value.

In ARP mode: **Speed** determines the speed of the arpeggiator in BPM with 1/8th note steps. The range goes from 24 up to 600 BPM. When external MIDI clock is received, you can adjust **Speed** in musical values (e.g. 1 bar) in reference to the frequency.

When external MIDI clock becomes inactive, LFO / Arp will remain on last **Speed** value until another speed is set.

By the way: The LED above the **Speed** knob is pulsating rhythmically to the LFO frequency. If in Arp mode, the LED will be blinking when arpeggiator notes are generated.

Additional Functions

MIDI Channel Settings

By using the MIDI Channel Selection button ❻ on the Rocket´s backside you can simultaneously set the desired MIDI transmitting as well as receiving channel:

• Press and hold the MIDI Channel Selection button.

• Send any MIDI note from your MIDI master keyboard. The Rocket will identify the MIDI channel of the sending device and set it as its own receiving and transmitting channel.

Sending and Receiving Sound Data

The sound dump function lets you send the actual sound parameter data of the Rocket via MIDI or USB.

After activation, all sound parameters of the Rocket are sent as MIDI controller data to a connected computer. Here you can record this data with a suitable software, e.g. a sequencer application.

☞ **Activation of the sound dump function:**

• To send the data, press and hold the Launch button for around one second.

• The corresponding MIDI controller data will automatically be sent and can be easily recorded.

> 🛈 If you are working with the Rocket in a recording studio, we recommend to save the actual sound data at the beginning of the Rocket MIDI track. This enables you to hear the right Rocket sound in your music production.

☞ **Receiving a sound dump:**

• Send the recorded MIDI controller data to the Rocket. The sound data will be automatically resumed.

> 🛈 Keep in mind: If sending sound data to the Rocket, all actual sound parameter edits will be lost.

> 🛈 The following parameters can not send MIDI Controller data: Headphone Volume, Filter Type switch, Boost switch and the Launch button.

Sound Synthesis Basics

Oscillators Introduction

The oscillator is the first building block of a synthesizer. It delivers the signal that is transformed by all other components of the synthesizer. In the early days of electronic synthesis, Robert A. Moog found that most real acoustic instrument waveforms can be reproduced by using abstracted electronic versions of these waveforms. He wasn't the first who came to that conclusion, but he was the first in recreating them electronically and building them into a machine that could be used commercially. What he implemented into his synthesizer were the still well-known waveforms sawtooth and square. For sure, this is only a minimal selection of the endless variety of waveforms, but the Waldorf Rocket gives you exactly these waveforms at hand.

Now, you probably know how these waveforms look and sound, but the following chapter gives you a short introduction into the deeper structure of these waveforms.

The Sawtooth Wave

The Sawtooth wave is the most popular synthesizer waveform. It consists of all harmonics in which the magnitude of each harmonic descends by the factor of its position. This means that the first harmonic (the fundamental) has full magnitude, the second harmonic has half magnitude, the third harmonic has a third magnitude and so on. The following picture shows how the individual harmonics build up the sawtooth wave:
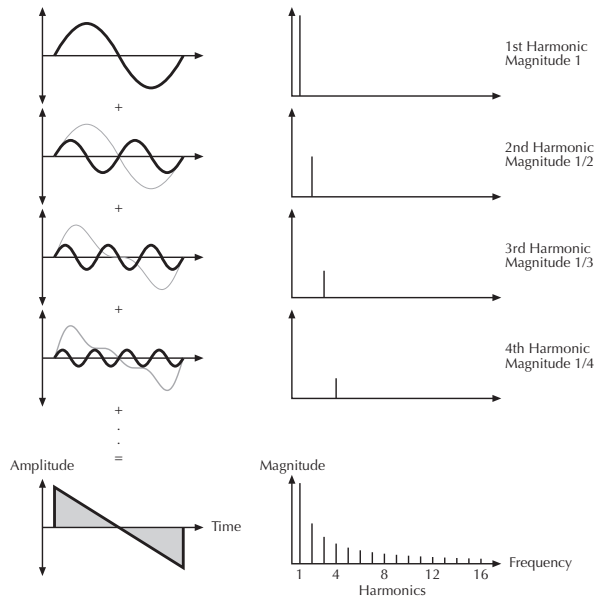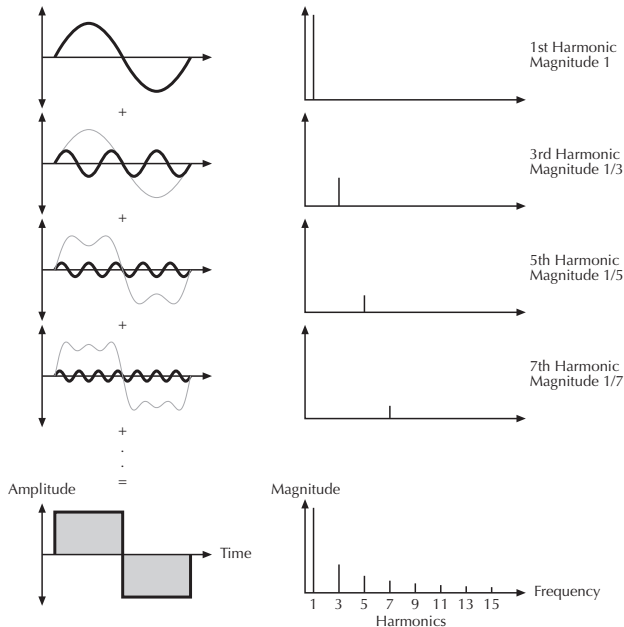
Additive components of the Sawtooth wave

The sawtooth wave was thought as an abstraction of the timbre of string and brass instruments. You can easily understand that when you think of a violin. Imagine a bow pulling the string slightly into one direction. At one point, the string abruptly comes off the bow and swings back to its original position. The bow is still moved and so it catches the string again and the procedure is repeated. The result is a waveform that looks like a sawtooth. The same is true for a brass instrument. The string in this case are the lips while the bow is the air. The lips are moved by the air to a certain extent and abruptly move back to their original position.

The Square Wave

The Square Wave is a pulse waveform with 50% pulse width. This means that the positive part of the waveform has the same length as the negative part. The pulse waveform can have other pulse widths as you will read later. For now, we´ll talk about the square wave as a unique waveform. The square wave consists of all odd harmonics in which the magnitude of each harmonic descends by the factor of its position. This means that the first harmonic has full magnitude, the third harmonic has a third magnitude, the fifth harmonic has a fifth magnitude and so on. The following picture shows how the individual harmonics build up the pulse wave:

Additive components of the square wave with 50% pulse width

The Pulse Wave

The Pulse Wave is the most versatile wave in a classic synthesizer because its shape and therefore its harmonic content can be changed in real time. This is done by changing the width of the upper and lower portion of the waveform cycle. These portions are called pulses, hence the name pulse width. The width of the first pulse is used to distinguish between different pulse waves and it is measured in percent. The following picture shows several pulse waves with different pulse widths:
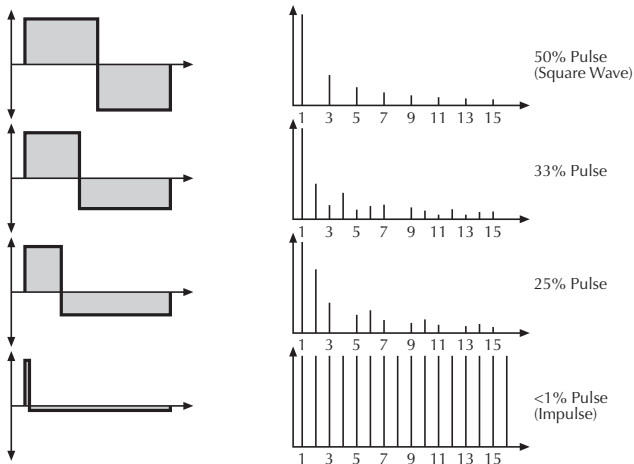
Additive components of Pulse wave with different pulse widths

The first fact you can probably observe is that the lower part of the wave has a narrower excursion. This is because the energy of the wider pulse is higher than the one of the narrower pulse. If this were not compensated, the overall signal would have an unwanted DC offset.

As you have read in the previous chapter, the harmonic content of a 50% pulse wave is a special case. It has a very symmetrical harmonic content, while all other pulse widths create peaks or troughs at certain frequencies. Another special case is a pulse wave with a very narrow pulse width, in the above picture labelled as <1%. An infinitely thin pulse creates a spectrum that has all harmonics with equal magnitudes. In a digital synthesizer, "infinitely" necessarily means one sample.

The pulse wave is an artificial wave, which means that it doesn't occur in nature. It was built into synthesizers because it can create a lot of different timbres with a minimum of technical effort. However, certain pulse widths sound very close to the timbres of acoustic (or semi-acoustic) instruments, i.e. a guitar or bass guitar, an e-piano or even a flute.

The most powerful feature of the pulse wave is the ability to change its width while sounding. This is called pulse width modulation. When the pulse width is changed, the waveform starts to sound thicker. This happens because the effect is very similar to what you hear when you have two oscillators running with slightly different frequencies. They interfere and create irregular troughs in the resulting waveforms.

Filter Introduction

Once the audio signal leaves the oscillator, it is sent to the filter. The filter is a component that has significant influence on the Rocket's sound characteristics.

For now, we'll explain the basic function of a filter discussing the type used most commonly in synthesizers: the low pass filter

The low pass filter type dampens frequencies above a specified cutoff frequency. Frequencies below this threshold are hardly affected. The frequency below the cutoff point is called the pass band range, the frequencies above are called the stop band range. The Rocket's filter dampens frequencies in the stop band with a certain slope. The following picture shows the basic principle of a low pass filter:
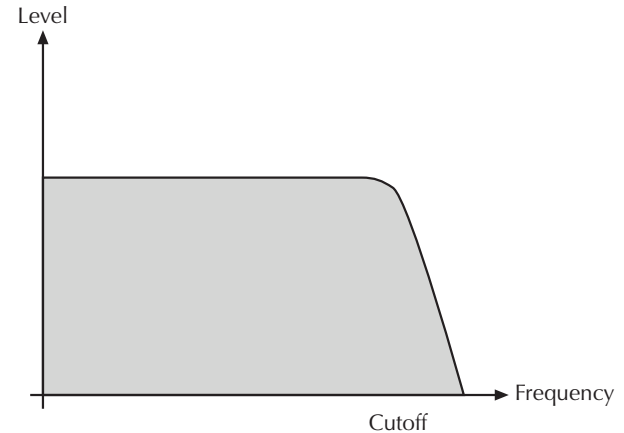
The Rocket's filter also features a resonance parameter. Resonance in the context of a low, band or high pass filter means that a narrow frequency band around the cutoff point is emphasized. The following picture shows the effect of the resonance parameter on the filter's frequency curve:

Level

Resonance

Cutoff

Frequency
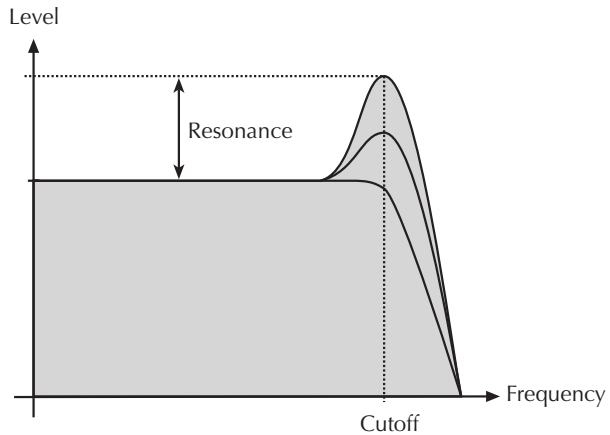
If the resonance is raised to a great extent, then the filter will begin to self-oscillate, i.e. the filter generates an audible sine wave even when it does not receive an incoming signal.

Appendix

Updating the Firmware

The Rocket has a service-friendly feature that makes it possible to update the system software without changing any parts.

All firmware updates come in the form of a standard MIDI file that can be read by nearly any sequencer. The fastest way to get this file is by downloading it from our web site at:

http://www.waldorfmusic.de

ℹ️ Possibly there will be a .zip file containing the new firmware as well as a manual addendum.

☞ **To update the Rocket's firmware:**

- Load the respective Standard MIDI File into your sequencer. Follow the instructions from your sequencer's manual.

ℹ️ We recommend to use our free Spectre software (for Windows PC and Mac) for updating the firmware. Please read more on the next page.

- The MIDI file consists of one single track with several sysex messages in it. Make sure that this track is assigned to the Rocket so that it can receive the data.

- Make sure that any Cycle or Loop mode is switched off. Also make sure that any Metronome clicks and MIDI Clock are switched off.

- Start the sequencer playing the file, and send the track data to the Rocket. The Launch button will blink rapidly during this procedure.

- After the file is received correctly, the Rocket burns the new firmware into its Flash memory.

ℹ️ You can perform a firmware update only via the USB connection.

ℹ️ After a successfull firmware update, the Rocket may perform an automatical filter calibration. Reduce the volume of your audio system to avoid damage.

> ⚠ **Don´t disconnect the Rocket and computer during firmware upgrade process. If this happens, please read the chapter "Issues during Firmware Upgrade Process".**

Firmware Update with Spectre

We recommend to use our free Spectre application for sending firmware updates to the Rocket:

<div align="center">

http://www.waldorfmusic.de/en/downloads/536 -spectre.html

</div>

- Connect the Rocket directly to a free USB port on your computer with an appropriate cable.

- Wait until your operating system (Windows XP/VISTA/Windows 7 or Mac OS X 10.5 or later) automatically recognizes the synthesizer as an "Audio MIDI Device".

- Start the Spectre application. With it you can check if your operating system has recognized the Rocket correctly. Click on the "Audio/MIDI-button". Under the MIDI outputs the Rocket should be listed as an available output. If that is not the case please check the previous steps again.

- In Spectre, click on the "Upgrade button" and find the Firmware MIDI-File. Confirm with "OK" to start the download.

- The Lauch button of your Rocket should flash rapidly during upgrade process.

- Don´t disconnect the Rocket and computer during the firmware upgrade process.

Issues during Firmware Upgrade Process

If you have any problems during firmware upgrade process, please proceed as follows:

- Disconnect the Rocket from the USB connection.

- Press and hold the MIDI Channel Selection button ❻ of the Rocket.

- Reconnect the USB connection of the Rocket. This starts the Bootloader mode automatically.

- Send the firmware again. Follow the instructions of the previous chapter.

Filter Calibration

The analog filter of the Rocket is calibrated at the factory. Tuning is very stable over a wide temperature range, so it is not necessary to use this function frequently:

- The Rocket will generate high-volume output during calibration, so turn headphones volume down as well as the volume of your speakers or alternatively disconnect the audio output. Also disconnect anything connected to the VCF input.

- Switch **Filter Type** to *LP*.

- Switch **Boost** to *off*.

- Send the MIDI tune request *0xF6* with a suited MIDI software to the Rocket.

- Calibration progress can take up to 30 seconds. The Launch button LED will light up in a dimmed mode while calibration is in progress.

Technical Data

Power Supply

Maximum current consumption: 100 mA

Dimensions and Weight

Width:	185 mm
Depht:	185 mm
Height (including knobs):	65 mm
Total weight:	0,9 kg

Factory Settings

MIDI Receive Channel	1
MIDI Transmit Channel:	1

MIDI Controller Numbers

The following controls can not send MIDI Controller data: Headphone Volume, Filter Type switch, Boost switch and the Launch button.

Ctrl #	Controlle Range	Controller name or Sound Parameter	Value Range
1	0…127	Modulation Wheel	0…127
70	0…127	Osc Wave	0…127
79	0…127	Osc Tune	0…127
31	0…127	Osc Shape	0: Saw, 1: Pulse
74	0…127	Cutoff	0…127
71	0…127	Resonance	0…127
73	0…127	Env Mod	0…127
83	0…127	Keytrack	0: off, 1: half, 2: full
76	0…127	LFO Speed	0…127
77	0…127	LFO Depth	0…127
78	0…127	LFO Shape	0: Saw down, 1: Tri, 2: Pulse
18	0…127	LFO Target	0: Arp, 1: Cutoff, 2: Pitch
75	0…127	ENV Decay	0…127
103	0…127	ENV Sustain	0: off, 1: on
72	0…127	ENV Release	0: off, 1: on
5	0…127	Glide	0…127
14	0…127	Arp Tempo	0…127
12	0…127	Arp Range	0…127
13	0…127	Arp Direction	0: random, 1: alt, 2: up
64	0…127	Sustain Pedal	64 = on
120		All Sound Off	immediate silence
121		Reset All Controllers	Resets Mod Wheel, Sustain Pedal, Aftertouch and Pitch Bend
122		Local Control	0: off, 127: on
123		All Notes Off	releases all voices

Glossary

Aftertouch

The majority of contemporary MIDI keyboards are capable of generating aftertouch messages. On this type of keyboard, when you press harder on a key you are already holding down, a MIDI Aftertouch message is generated. This feature is used to control the Cutoff frequency of the Rocket.

Amount

Describes to which extent a modulation influences a given parameter.

Amplifier

An amplifier is a component that influences the volume level of a sound via a control signal. This control signal is often generated by an envelope or an LFO.

Arpeggiator

An arpeggiator is a device that splits an incoming chord into its single notes and repeats them rhythmically. Most arpeggiators feature different sequence modes to cover a wide range of applications. Typical controls for an ar-peggiator are the octave range, the direction, the speed and the clock, which means the repetition interval. Some arpeggiators also feature preset or programmable rhythm patterns.

Band Pass Filter

A band pass filter allows only those frequencies around the cutoff frequency to pass. Frequencies both below and above the cutoff point are damped.

Control Change (Controllers)

MIDI messages enable you to manipulate the response of a sound generator to a significant degree.

This message essentially consists of two components:

- The Controller number, which defines the element to be influenced. It can be between 0 and 120.

- The Controller value, which determines the extent of the modification.

Controllers can be used for effects such as slowly swelling vibrato and influencing filter frequency.

Decay

"Decay" describes the descent rate of an envelope once the Attack phase has reached its zenith and the envelope drops to the level defined for the Sustain value.

Envelope

An envelope is used to modulate a sound-shaping component within a given time frame so that the sound is changed in some manner. For instance, an envelope that modulates the cutoff frequency of a filter opens and closes this filter so that some of the signal's frequencies are filtered out. An envelope is started via a trigger, usually a fixed trigger. Normally, the trigger is a MIDI Note. The classic envelope consists of four individually variable phases: Attack, Decay, Sustain and Release. This sequence is called an ADSR envelope. Attack, Decay and Release are time or slope values, and Sustain is a variable volume level. Once an incoming trigger is received, the envelope runs through the Attack and Decay phases until it reaches the programed Sustain level. This level remains constant until the trigger is terminated. The envelope then initiates the Release phase until it reaches the minimum value.

Filter

A filter is a component that allows some of a signal's frequencies to pass through it and dampens other frequencies. The most important aspect of a filter is the filter cutoff frequency. Filters generally come in four categories: low pass, high pass, band pass, and band stop. A low pass filter dampens all frequencies above the cutoff frequency. A high pass filter in turn dampens the frequencies below the cutoff. The band pass filter allows only those frequencies around the cutoff frequency to pass, all others are dampened. A band stop filter does just the opposite, i.e. it dampens only the frequencies around the cutoff frequency. The most common type is the low pass filter.

Filter Cutoff Frequency

The filter cutoff frequency is a significant factor for filters. A low pass filter dampens the portion of the signal that lies above this frequency. Frequencies below this value are allowed to pass through without being processed.

High Pass Filter

A high pass filter dampens all frequencies below its cutoff frequency. Frequencies above the cutoff point are not affected.

LFO

LFO is an acronym for low-frequency oscillator. The LFO generates a periodic oscillation at a low frequency and features variable waveshapes. Similar to an envelope, an LFO can be used to modulate a sound-shaping component.

Low Pass Filter

Synthesizers are often equipped with a low pass filter. A low pass filter dampens all frequencies above its cutoff frequency. Frequencies below the cutoff point are not affected.

MIDI

The acronym MIDI stands for "musical instrument digital interface." It was developed in the early 1980s so that diverse types of electronic musical instruments by different manufacturers could interact. At the time a communications standard for heterogeneous devices did not exist, so MIDI was a significant advance. It made it possible to link all devices with one another through simple, uniform connections.

Essentially, this is how MIDI works: One sender is connected to one or several receivers. For instance, if you want to use a computer to play the Rocket, then the computer is the sender and the Rocket acts as the receiver. With a few exceptions, the majority of MIDI devices are equipped with two or three ports for this purpose: MIDI In, MIDI Out and in some cases MIDI Thru. The sender transfers data to the receiver via the MIDI Out jack. Data are sent via a cable to the receiver's MIDI In jack.

MIDI Thru has a special function. It allows the sender to transmit to several receivers. It routes the incoming signal to the next device without modifying it. Another device is simply connected to this jack, thus creating a chain through which the sender can address a number of receivers. Of course it is desirable for the sender to be able to address each device individually. Consequently, there is a rule which is applied to ensure each device responds accordingly.

MIDI Channel

This is a very important element of most messages. A receiver can only respond to incoming messages if its receive channel is set to the same channel as the one the sender is using to transmit data. Subsequently, the sender can address specific receivers individually. MIDI Channels 1 through 16 are available for this purpose.

MIDI Clock

The MIDI Clock message determines the tempo of a piece of music. It serves to synchronize processes based on time.

Modulation

A modulation influences or changes a sound-shaping component via a modulation source. Modulation sources include envelopes, LFOs or MIDI messages. The modulation destination is sound-shaping component such as a filter or a VCA.

Note on / Note off

This is the most important MIDI message. It determines the pitch and velocity of every generated note. The time of arrival is simultaneously the start time of the note. Its pitch is derived from the note number, which lies between 0 and 127. The velocity lies between 1 and 127. A value of 0 for velocity is similar to "Note Off".

Pitchbend

Pitchbend is a MIDI message. Although pitchbend messages are similar in function to control change messages, they are a distinct type of message. The reason for this distinction is that the resolution of a pitchbend message is substantially higher than that of a conventional Con-

troller message. The human ear is exceptionally sensitive to deviations in pitch, so the higher resolution is used because it relays pitchbend information more accurately.

Release

An envelope parameter. The term "Release" describes the descent rate of an envelope to its minimum value after a trigger is terminated. The Release phase begins immediately after the trigger is terminated, regardless of the envelope's current status. For instance, the Release phase may be initiated during the Attack phase.

Resonance

Resonance is an important filter parameter. It emphasizes a narrow bandwidth around the filter cutoff frequency by amplifing these frequencies. This is one of the most popular methods of manipulating sounds. If you substantially increase the resonance, i.e, to a level where the filter begins self-oscillation, then it will generate a relatively clean sine waveform.

Sustain

An envelope parameter. The term "Sustain" describes the level of an envelope that remains constant after it has run through the Attack and Decay phases. Sustain lasts until the trigger is terminated.

System Exclusive Data

System exclusive data allow access to the heart of a MIDI device. They enable access to data and functions that no other MIDI messages are able to address. "Exclusive" in this context means that these data pertain only to one device type or model. Every device has unique system exclusive data. The most common applications for SysEx data include transfer of entire memories and complete control of a device via a computer.

Trigger

A trigger is a signal that activates events. Trigger signals are very diverse. For instance, a MIDI note or an audio signal can be used as a trigger. The events a trigger can initiate are also very diverse. A common application for a trigger is its use to start an envelope.

USB

The Universal Serial Bus (USB) is a serial bus system to connect a computer with an external device. USB equipped devices can be plugged together while active. The recognition is made automatically.

Volume

The term describes a sound's output level

waldorf

EG Konformitätserklärung
Declaration of Conformity

des Herstellers / *of the manufacturer:*

Waldorf Music GmbH
Landskroner Str. 52
53474 Bad Neuenahr / Germany

Verantwortliche Person / *Responsible person:*

Stefan Stenzel

erklärt hiermit, dass das Produkt / *will be hereby declared that the following named product*

Waldorf Rocket

Gerätetyp / *Device type:* **Synthesizer**

Gerätenummer / *Device number*: **426012638040**

in Übereinstimmung mit den Richtlinien,
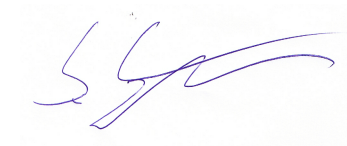
conforms to the requirements

2004/108/EG und 2006/95/EG

in Verkehr gebracht wurde. Für die Konformitätserklärung wurde nachstehende Norm angewandt:

The following standards have been used to declare conformity:

EN 55013

Heppingen, 10th of December 2012

Stefan Stenzel, Geschäftsführer

Stefan Stenzel, Board Of Managment

$C\epsilon$

Am 15.12.2004 wurde die überarbeitete Richtlinie 2004/108/EG zur Elektromagnetischen Verträglichkeit von der Europäischen Kommission veröffentlicht (AB. L 390/2004). Sie ersetzt die bisher geltende EMV-Richtlinie 89/336/EWG.

Im Zusammenhang mit dieser Überarbeitung gelten folgende Übergangsfristen: Im Juli 2007 wird die bisher geltende Richtlinie (89/336/EWG) aufgehoben. Die Übergangsfrist zur Anwendung der neuen Richtlinie (2004/108/EG) endet am 20. Juli 2009.

Normen für Audio

EN 55013 EN 55020 EN 61000-3-2 EN 61000-3-3)

EN 55013

Ton-und Fernseh-Rundfunkempfänger und verwandte Geräte der Unterhaltungselektronik -Funkstöreigenschaften -Grenzwerte und Messverfahren (IEC/ CISPR 13: 2001, modifiziert

+ A1: 2003); Deutsche Fassung EN 55013: 2001 + A1: 2003

EN 55020

Ton-und Fernseh-Rundfunkempfänger und verwandte Geräte der Unterhaltungselektronik -Störfestigkeitseigenschaften - Grenzwerte und Prüfverfahren (IEC/ CISPR 20: 2002 + A1: 2002); Deutsche Fassung EN 55020: 2002 + A1: 2003

EN 61000-3-2

Elektromagnetische Verträglichkeit (EMV) – Teil 3-2: Grenzwerte – Grenzwerte für Oberschwingungsströme (Geräte-Eingangsstrom £ 16 A je Leiter) (IEC 61000-3-2: 2000, modifiziert) Deutsche Fassung EN 61000-3-2: 2000

EN 61000-3-3

Elektromagnetische Verträglichkeit (EMV) - Teil 3-3: Grenzwerte – Begrenzung von Spannungsänderungen, Spannungs-schwankungen und Flicker in öffentlichen Niederspannungs-Versorgungsnetzen für Geräte mit einem Bemessungsstrom £ 16 A je Leiter, die keiner Sonderanschlussbedingung unterliegen (IEC 61000-3-3: 1994 + A1: 2001) Deutsche Fassung EN 61000-3-3: 1995 + Corrigendum: 1997 + A1: 2001

Andere Normen unter

http://www.ce-zeichen.de/nsp.htm

2006/95/EG Elektrische Betriebsmittel (Niederspannungsrichtlinie)

FCC Information (U.S.A.)

1. IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT! This product, when installed as indicated in the instructions contained in this Manual, meets FCC requirements. Modifications not expressly approved by Waldorf may void your authority, granted by the FCC, to use this product.

2. IMPORTANT: When connecting this product to accessories and/or another product use only high quality shielded cables. Cable/s supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.

3. NOTE: This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class „B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the users manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determined by turning the unit „OFF" and „ON", please try to eliminate the problem by using one of the following measures: Relocate either this product or the device that is being affected by the interference. Utilize power outlets that are on branch (Circuit breaker or fuse) circuits or install AC line filter/s. In the case of radio or TV interference, relocate/reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to co-axial type cable. If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distributed this type of product. The statements above apply ONLY to products distributed in the USA.

Canada

The digital section of this apparatus does not exceed the „Class B" limits for radio noise emissions from digital apparatus set out in the radio interference regulation of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de briut radioelectriques depassant les limites aplicables aux appareils numeriques de la „Classe B" prescrites dans la reglement sur le brouillage radioelectrique edicte par le Ministre Des Communications du Canada. Ceci ne s'applique qu'aux produits distribués dans Canada.

Other Standards (Rest of World)

This product complies with the radio frequency interference requirements of the Council Directive 89/336/EC.

Cet appareil est conforme aux prescriptions de la directive communautaire 89/336/EC.

Dette apparat overholder det gaeldenda EF-direktiv vedrørendareadiostøj.

Diese Geräte entsprechen der EG-Richtlinie 89/336/EC.

Product Warranty

Thank you for choosing this Waldorf product. It is a dependable device and is designed to last. However, the potential for defects in material or workmanship cannot be eradicated completely. This is why we provide an extended warranty for you. This warranty covers all defects in material and workmanship for a period of one year from the date of original purchase. During this time, Waldorf Music will repair or replace the product without charge for materials or labor, provided the product was first inspected and found faulty by Waldorf Music or an authorized service center. You must first contact your dealer or distributor by telephone. Products that were mailed without prior agreement cannot be exchanged or repaired free of charge. The unit must be insured and sent prepared in its original package. Please include a detailed description of the defect. Products that were not send prepared or in the original package will be returned unopened. Waldorf Music reserves the right to upgrade the unit with the latest technological advances if necessary. This warranty does not cover defects due to abuse, operation under other than specified conditions, or repair by unauthorized persons. The warranty covers only those malfunctions caused by material or work-manship defects that occur during normal operation.

Product Support

If you have any questions about your Waldorf product, feel free to contact us via one of the four options listed below:

① Send us an email message. This is the most efficient and fastest way to contact us. Your questions will be forwarded immediately to the resident expert and you will quickly receive an answer.

support@waldorfmusic.de

② Send us a letter. It will take a bit longer, but it is just as dependable as an email.

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