



ELEKTROAKUSTISCHE MANUFAKTUR

# Retroverb Lancet

User Guide

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# Introduction

Today's digital effects and plug-ins can create almost perfect room simulations. However, when it comes to characteristic and charismatic reverb, analogue effect-processors are yet to beat. The reverberating sound of a spring is so lively and unique that its sound is almost impossible to recreate in the digital domain.

In addition to this, Retroverb Lancet is not just a spring reverberation system – it is an analogue multi-effects-processor. It offers overdrive, filtering, VCA, envelope generator and LFO to manipulate the spring sound and create different effects like Auto-Wah, Tremolo, Distortion, Delay, Gater and of course Reverb. It is far from perfection but sonically unmatched.

Enjoy your Retroverb Lancet!

Your VERMONA crew from the  
Elektroakustischen Manufaktur, Erlbach

# Important Safety Information

The following safety precautions must be observed during all phases of operation, service and repair of Retroverb Lancet! Failure to comply with these precautions or with specific warnings in this manual violates safety standards of design, manufacture and intended use of this equipment.

**We assume no liability for the customer's failure to comply with these requirements!**

## Cleaning

Please clean Retroverb Lancet with a dry duster only. Do not use sharp cleaning fluids or water!

## Dampness

Retroverb Lancet may not be used in damp or wet places. Make sure the unit is not used in humid atmospheres (walls, floors, ceilings etc.) because this could cause condensation within the unit.

**WARNING: Risk of electrical shock!**

## Use near explosive goods

Retroverb Lancet may not be used near easy flammable or explosive goods.

## Cooling System

Retroverb Lancet may not be used near heating systems, warm or hot fans etc. When using the unit in a rack, wall system or fixed installation, make sure the unit has enough space to let the generated heat dissolve.

## Accessories

Do only use cables, plugs and adapters, which do not affect the normal use of the unit.

## Spare Parts or Modifications

Modification instructions and schematic information should only be used from service departments of our officially authorized dealers. To prevent the risk of electrical shock, do not open the unit yourself. Due to the risk of injury, we prohibit the installation of additional components or any modification to the existing circuits!

**Always disconnect the DC adapter before opening the unit!**

**We will not be liable for any claims in these cases!**

# Getting Started

To ensure top quality we carefully checked Retroverb Lancet before packaging. Nevertheless, the unit could have been damaged during transportation. Therefore, we ask you to take a serious look at the unit when unpacking it. Do not hesitate to contact us, should there be anything unusual on Retroverb Lancet itself or its packaging.

You should find the following items in the box:

- one Retroverb Lancet
- one DC adapter (12 V DC / 1000 mA)
- this manual

## Connections and Powering

If you came here without any problems, you can finally start up your Retroverb Lancet:

1. Connect the provided power supply unit to the **12 VDC** ⑤ jack on Retroverb Lancet



**Only use the included 12 V DC / 1000 mA power supply! There is no need to mind the polarity as Retroverb Lancet can handle center-negative and center-positive power adapters.**

2. Connect the **INPUT** ⑨ jack of Retroverb Lancet to an appropriate audio source such as a drum-computer, a groove-box, a synthesizer, a guitar or CD-player.
3. Connect the **OUTPUT** ⑭ jack of Retroverb Lancet to an appropriate audio input of a mixing console, an audio-interface or an amplifier.
4. Start Retroverb Lancet by switching on **OVERKILL** ⑰ on the unit's rear. The corresponding green LED above the **BALLS** control ⑩ in the VCF section will be lit.

Congratulations, Retroverb Lancet has been started and is ready to work.

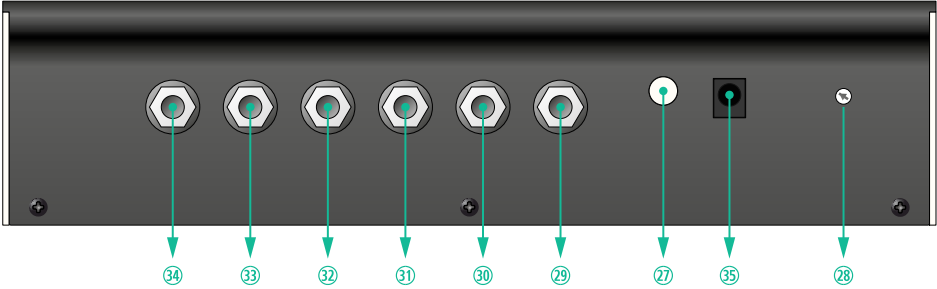


Figure 1: rear connections and control elements of Retroverb Lancet

# Components and Controls

Retroverb Lancet is an analogue effects processor. Beside its main sound shaping element - the spring reverb - it offers powerful functions such as multimode-filtering, overdrive, VCA, LFO and an envelope generator. This section will take a closer look to the different sections of Retroverb Lancet and their correspondent control elements.

## Input Section (IN)

This section controls the input sensitivity and a possible analogue overdrive of the circuit. The amount of possible distortion in Retroverb Lancet ranges from light saturation to hefty distortion.

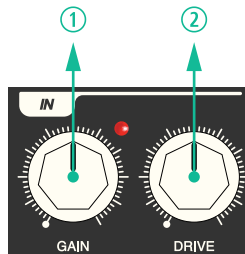


Figure 2: The Input Section

### ① GAIN

Use this control to set the input level. A corresponding LED will indicate overloads. Set the control in a way that the LED only lights up during signal peaks. Retroverb Lancet has a large gain range that allows line- as well as instrument-level-signals to be connected and adequately pre-amplified. Do not worry if the clip-LED already lights up in the gain control's first half when using line-level-signals. Using higher **GAIN** settings will allow you to distort the input, which will result in a noticeable increase of volume.

Retroverb Lancet's input was designed to handle high-impedance signals of instrument pickups, too. There is no need to use a DI-box here. Instead, you may connect your guitar, bass or Clavinet directly.



Using too little pre-amplification will decrease the signal to noise ratio. In addition, the envelope generator's trigger sensitivity (see ["Envelope Generator \(EG\)" on page 17](#)) as well as the envelope-follower (see ["Envelope Follower \(EF\)" on page 18](#)) directly depend on the input level setting. Checking for best possible levels is essential for best results from your Retroverb Lancet.

② **DRIVE**

This control adjusts the amount of distortion applied to the input signal. Note that **DRIVE** will take effect on the processed as well as on the dry signal. With **MIX** ③ turned fully counter-clockwise, the signal can still be distorted if needed. The distortion can be disabled by switching **BYPASS** ⑤ on. In contrary to distortion achieved with the **GAIN** control ①, **DRIVE** will not significantly raise the level when increasing the amount of drive.

## Output Section (OUT)

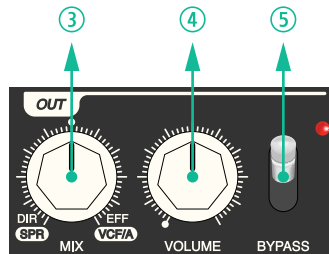


Figure 3: The Output Section

③ **MIX**

This control adjusts the ratio between direct and processed signal. **MIX** changes its function depending on the selected routing of the spring within the signal chain.

With **SPRING** ⑦ set to **OFF** or **PRE**, **MIX** blends between the input section including overdrive (left) and the signal processed with reverb, VCF and VCA (right).

With **SPRING** ⑦ switched to **POST**, **MIX** blends between the reverberated signal (left) and the signal processed by VCF and VCA (right).

For more information see „Spring Section“ on page 9.

④ **VOLUME**

This control sets the output level of Retroverb Lancet.



⑤ **BYPASS** Set this switch to the lower position (the red LED lights up) to disable all sections of Retroverb Lancet. The unit offers a true bypass meaning that the complete signal path including the input pre-amplification stage is disabled. The input signal is passed directly to the output after the input jack. With the switch set to the upper position, all sections are active.

③ **BYPASS** input This TRS-jack allows connecting a single- or double foot switch to remote-control the bypass function. Using a double foot switch allows you to either switch the unit to bypass or to disable the spring reverb section only.

To use the double foot switch function, the foot switch needs to be equipped with a TRS-jack. The spring bypass uses the ring contact, while the total bypass uses the tip contact. Connecting a TS-jack allows switching the global bypass function only.



Figure 4: Connecting a Bypass Switch

👉 Since this function is a switch, it does not matter whether you use a foot switch configured as being normally closed or normally open. However, if the foot switch has a corresponding LED, normally open configured switches will work as expected while normally closed configurations will display the status reversed.

## Spring Section

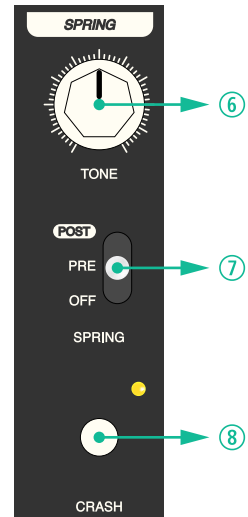
The spring reverberation system creates an artificial reverb sound using electro-mechanical techniques. Its sound is metallic and differs significantly from today's modern, digital solutions. It may sound artificial but owns a lot of character. Spring reverb is a preferred choice of guitarists and organ keyboarders until today but is also often found in electronic and dub productions.

⑥ **TONE** controls the sound character of the reverberation effect. The control is designed in a way that the bass and treble content is adjusted through a single potentiometer. Turning **TONE** counterclockwise from center will enhance the low frequencies with higher frequencies being attenuated. Turning clockwise from center will work vice versa.

**TONE** is efficient when using low frequency intense source signals. The high energetic bass content can stimulate the spring heavily leading to smeared results of the effect. Here, attenuation of the low frequency content through **TONE** will lead to a more focused sound image.

⑦ **SPRING** Using the **SPRING** switch, the spring can be placed at two different positions of the signal path.

With the switch set to **POST**, the spring is placed after the filter and the VCA. The signal will reach the output stage in parallel to the VCF/VCA section. The **MIX** control ③ allows balancing the signal between the VCF/VCA signal and the reverb output.



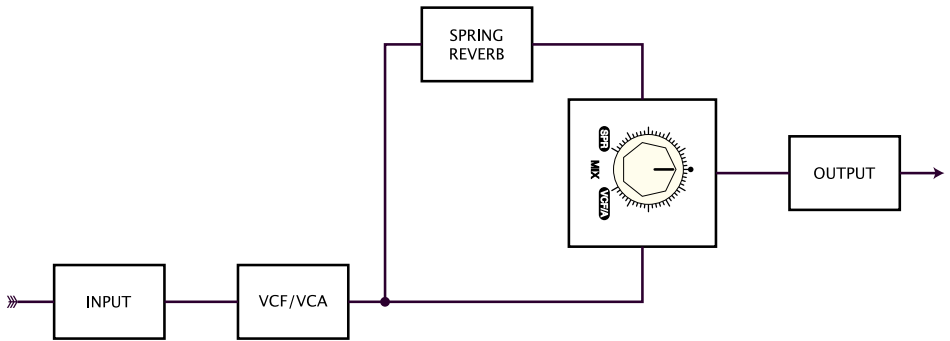


Figure 5: signal flow with SPRING set to POST

With the switch set to **PRE**, the spring is placed before the filter and the VCA. This mode allows shaping of the reverb tail. In contrary to common spring reverb units, this configuration has control over the decay time through the VCA envelope.

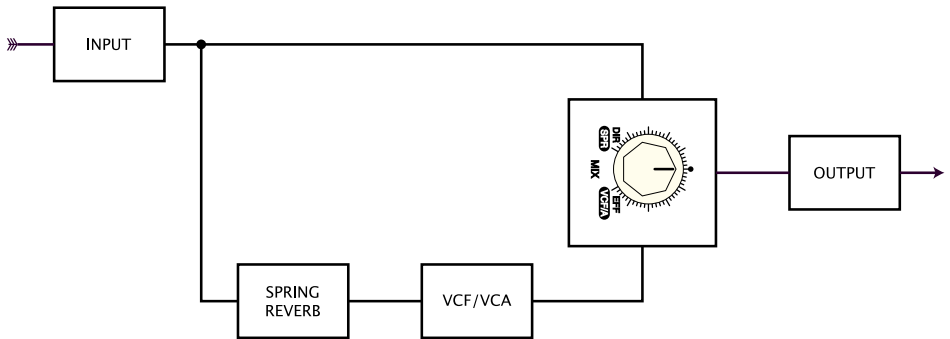


Figure 6: signal flow with spring set to PRE

If the switch is set to **OFF** the signal won't pass the spring section, logically there won't be any reverb.

**⑧ CRASH**

It was and still is popular amongst guitarists to kick their amp and rattle the built in spring reverb this way. Because the spring is installed inside a shielding metal tray, the kick causes the spring to hit the tray's walls. This results in a distinctive crash sound.

With Retroverb Lancet, there's no need to kick your gear. Simply press the **CRASH** button with the same result. But, use **CRASH** with care. The effect is exceptionally loud and may lead to overloads of your A/D-converters.



**Slight knocking on Retroverb Lancet's enclosure or vibrations nearby may also stimulate the spring, but unlike the intense CRASH function. If this is undesirable, place Retroverb Lancet on a stable base.**

**⑩ CRASH input**

This jack allows connecting a gate signal with at least 4 volts and positive slope. These signals are widely available from analogue sequencers, modular synthesizer systems as well as from LFOs using square waveforms. Use this input to trigger the **CRASH** function ⑧ at exact rhythmical positions.

## Filter (VCF)

Retroverb Lancer's multimode filter allows shaping the reverberated signal. However, the unit may also be used as a fully functional filter box without the reverb effect. The filter can be configured as low pass, high pass and band pass. Each type will suppress certain frequencies that will result in specific sound coloring. Let us start with a short explanation of the available filter types.

### Low pass

The low pass will only let the low frequencies of the input signal pass. **CUTOFF** ⑩ sets the frequency where the attenuation starts. The lower **CUTOFF** ⑩ is set, the more high frequencies will be suppressed, resulting in a sound more muffled.

A slowly opening low pass filter is a characteristic element of countless House- and Dance-tracks. Its rising effect will accentuate intros, breaks and build-ups.

### High pass

The high pass filter is the exact opposite of the low pass filter. It will only let high frequencies of the input signal pass. **CUTOFF** ⑩ sets the frequency where the attenuation starts. The higher **CUTOFF** ⑩ is set, the more low frequencies will be suppressed and the sound will lose bass. The high pass filter is well suited for mash-up-mixing. It allows removing/attenuating bass drums and bass-lines from a track that is to be mixed with a second track.

### Band pass

The band pass filter is a combination of a low pass- and high pass filter. It will only let a certain frequency band of the input signal pass. **CUTOFF** ⑩ sets the center for that frequency band. By moving **CUTOFF** ⑩, you determine the position of the frequency band within the whole frequency range. The band pass offers a slope less steep than that of the other filter types.

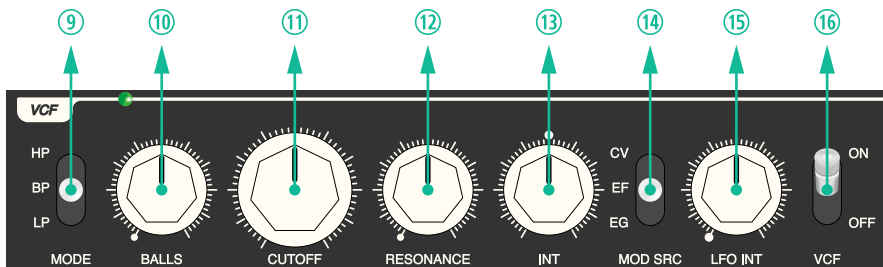


Figure 7: The Filter Section

⑨ **MODE** selects the filter type.

<b>LP</b>	Low pass filter with a slope of 24dB per octave.
<b>BP</b>	Band pass filter with a slope of 12dB per octave.
<b>HP</b>	High pass filter with a slope of 24dB per octave.

⑩ **BALLS** **BALLS** will emphasize low and higher frequencies in a predefined ratio. The resulting signal will cut through the mix with increased punch and bass amount. The high frequency enhancement will be best accentuated with higher **RESONANCE** ⑫ settings.

⑪ **CUTOFF** This control manually sets the filter's cutoff-frequency. This is the frequency from which the audio signal is manipulated (filtered) with the filter's slope. In low pass mode (**LP**) the filter is fully opened with **CUTOFF** turned fully clockwise, closed when turned fully counterclockwise. In high pass mode (**HP**), the principle of operation works oppositely. When using the filter in band pass mode (**BP**), there is no fully opened filter. Here, specific frequencies are always suppressed.

⑫ **RESONANCE** Resonance is a feedback circuit within the filter that emphasizes the cutoff frequency. Its intensity is set by the **RESONANCE** control. Lower values will slightly color the sound, higher values more significantly. With higher values, the filter will also start to self-oscillate, generating a sine wave at the cutoff frequency set with **CUTOFF** ⑪.



**Resonance in Retroverb Lancet will easily reach self-oscillation and produce a constant sine-wave-like tone that may have a very high output level. So please be careful with RESONANCE to avoid damage following equipment. As a precaution you should turn VOLUME ④ down before playing around with RESONANCE!**

⑬ **INT** The **INT** control sets the intensity of the cutoff frequency being controlled by a modulation source. The **MOD SRC** switch ⑭ selects this source. The **INT** control works bipolar. Turning clockwise from the center position results in upwards **CUTOFF** ⑪ modulation while turning left from center results in downwards modulation. In its center position, **CUTOFF** ⑪ modulation is deactivated.

⑭ **MOD SRC** The **MOD SRC** switch selects the modulation source for the cutoff frequency. There are three possible sources:

<b>EG</b>	the envelope generator - <a href="#">see "Envelope Generator (EG)" on page 17.</a>
<b>CV</b>	external signal connected to the <b>PEDAL/CV</b> input ⑳ - <a href="#">see "Pedal/CV-Input" on page 18.</a>
<b>EF</b>	the envelope follower - <a href="#">see "Envelope Follower (EF)" on page 18.</a>



**Combing an envelope-follower with rhythmic audio-signals such as drum loops is quite useful. Another useful application is using a guitar with the Retroverb Lancet set to band pass filtering with audible resonance. An envelope-follower will create a sound that resembles of the typical Auto-Wah effect.**

⑮ **LFO INT** This control sets the LFO's modulation intensity towards the cutoff frequency. The filter's frequency will be modulated periodically according to the selected LFO's waveform and its speed.

⑯ **VCF** This switch will enable or disable the complete filter section.

## Amplifier (VCA)

A voltage-controlled-amplifier (VCA) controls Retroverb Lancet's output.

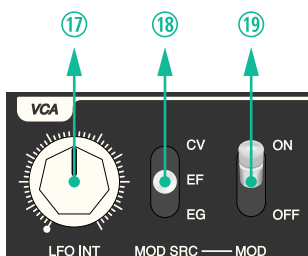


Figure 8: The VCA Section

- ⑰ **LFO INT**      This control sets the LFO's modulation intensity towards the output volume. The result is a tremolo-effect.
- ⑱ **MOD SRC**      This switch sets the modulation source for the VCA. There are three positions:

<b>CV</b>	external signal connected to the <b>PEDAL/CV</b> input ⑳ - see "Pedal/CV-Input" on page 18.
<b>EF</b>	the envelope follower - see "Envelope Follower (EF)" on page 18.
<b>EG</b>	the envelope generator - see "Envelope Generator (EG)" on page 17.

- ⑲ **MOD**      This switch enables or disables the modulation via the selected modulation source. If it is set to **OFF** the VCA is opened permanently.

**MOD** does not influence the LFO modulation set by **LFO INT** ⑰.



# Modulation

## Modulation Generator (LFO)

The LFO (Low Frequency Oscillator) is an oscillator specialized on slow frequencies that are used to create cyclic repeating modulations. Its frequency is variable, ranging from 0.05 Hz to 300 Hz, being divided in two switchable ranges. The LFO allows modulating the VCF and/or VCA, each with individually adjustable intensity.

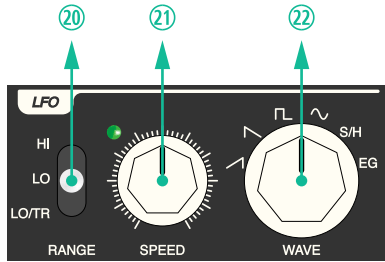


Figure 9: The LFO Section

②① **RANGE** The range switch selects the LFO’s frequency range:

<b>LO/TR</b>	Low frequencies (0.05 Hz-25 Hz) with re-trigger. Incoming trigger-signals will restart the waveform (depending on the <b>TRIG SRC</b> ②⑥ setting in the EG section). Using suited trigger settings allow synchronizing the LFO to an external tempo. It may also act as a simple envelope using rhythmical trigger signals with a suited waveform selected.
<b>LO</b>	Lower frequency range (0.05 Hz-25 Hz), free oscillating LFO.
<b>HI</b>	Higher frequency range (1 Hz-300 Hz), free oscillating LFO.

②② **SPEED** This control sets the LFO speed (frequency). The available range depends on the **RANGE** ②① setting.

②③ **WAVE** This switch selects the LFO waveform. Choices are ascending saw tooth (∕), descending saw tooth (∖), rectangle (Π), sine (~), Sample & Hold (S/H / random).

A distinctive feature is the waveform **EG**. It derives from the envelope modulator. Use **ATTACK** ②③ and **DECAY/RELEASE** ②④ to shape the waveform freely. With **ATTACK** ②③ set to zero and **DECAY/RELEASE** ②④ at a higher value, you

will receive a descending saw tooth. A triangle results from identically raised **ATTACK** ⑳ and **DECAY/RELEASE** ㉔ values. Since the envelope controls use logarithmic scaling, the resulting EG waveforms will differ slightly from the linear preset LFO waveforms.

## Envelope Generator (EG)

Retroverb Lancel's envelope generator (EG) generates a variety of envelope shapes depending on the trigger source used. It will work as an Attack/Decay envelope when using triggers from the audio **INPUT** ㉙ or the **TRIGGER IN** ㉚. It will work in three phases (Attack, Sustain, Release) when using gate signals at the **TRIGGER IN** ㉚. The sustain period is dependent on the duration of the incoming gate signal. The release phase will follow once the gate signal has been ended.

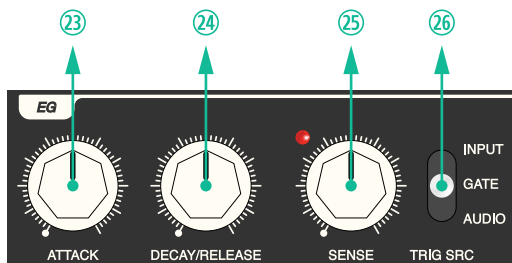


Figure 10: The Envelope Generator (EG)

- ⑳ **ATTACK**      Adjusts the rising time from 0 ms to 10 s (maximum level).
- ㉔ **DECAY/RELEASE**      Adjusts the decay time for the sound between 0 ms to 15 s.
- ㉕ **SENSE**      controls the sensitivity for the trigger source. **SENSE** will be inactive with **GATE** being selected as trigger source.
- ㉖ **TRIG SRC**      sets the trigger source:

<b>INPUT</b>	the audio input
<b>GATE</b>	a 5 volts gate voltage applied to the <b>TRIGGER IN</b> jack ㉚
<b>AUDIO</b>	an audio signal fed into the <b>TRIGGER IN</b> jack ㉚

## Envelope Follower (EF)

The envelope-follower converts the amplitude characteristic of the audio input signal into a control voltage. Most audio signals do not show clear levels and jumps as pure control voltages. This results in the envelope-follower being less effective compared to a regular envelope. In most cases, it is therefore necessary to increase the VCF modulation intensity to achieve a comparable effect depth.

## Pedal/CV-Input

This input allows connecting a suited pedal or an analogue control voltage as modulation source. **MOD SRC** ⑭/⑰ has to be switched to **CV** when using this input.

### Using a pedal

The **PEDAL/CV** input ⑳ allows connecting expression pedals with a TS-connector. In addition, volume pedals with in- and output can be connected using Y-cables. Use an expression pedal with a resistance of 100 k $\Omega$  to ensure smooth control scaling.

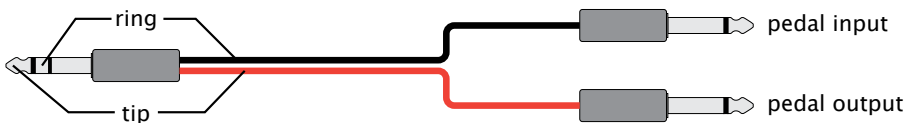


Figure 11: Connecting a Volume Pedal with a Y-cable

### Using a control voltage

Analogue control voltages ranging from 0-5 volts can be connected to the **PEDAL/CV** input ⑳. This allows Retroverb Lancet to be controlled from external CV-sources such as step-sequencers, key-CV of analogue synthesizers, LFOs with special functions as well as Theremin antennas.

## Further Control Elements

- ⑳ **OVERKILL**      Connects Retroverb Lancet to the DC-power-supply-unit. A green LED shows an active powered unit.
  
- ㉑ **REV LEVEL**      This controller allows to adjust the reverb level. Turning it counterclockwise will decrease the reverb signal while turning clockwise amplifies the signal.  
  
 The reverb level is already set to a useful value and readjusting won't be necessary in most cases.

## Connectors

Find a short description of the connectors on Retroverb Lancet's rear panel.

- ㉒ **INPUT**            Input jack for the audio signal.
  
- ㉓ **PEDAL/CV**        Allows connecting a CV-source or a pedal to control the cutoff frequency.
  
- ㉔ **CRASH**            Allows connecting a gate signal to trigger the **CRASH** function ⑧.
  
- ㉕ **TRIGGER IN**      Allows connecting audio or gate signals to trigger the envelope-generator.
  
- ㉖ **BYPASS**          Allows connecting a single or double bypass footswitch pedal.
  
- ㉗ **OUTPUT**          Carries the output signal of Retroverb Lancet to be connected to a mixing console, an audio-interface or an amplifier.
  
- ㉘ **12 VDC**          Connect the supplied 12 V DC power supply here.

# Technical Specifications

<b>Input</b>	
min. input level	-26 dBu
impedance	1 M $\Omega$
<b>Output</b>	
max. input level	20 dBu
impedance	600 $\Omega$
<b>Audio trigger</b>	
min. input level	- 32 dBu
impedance	1 M $\Omega$
<b>GATE</b>	
Threshold	+4 V
<b>CV input</b>	
voltage	$\pm$ 10 V
<b>Signal-to-Noise Ratio</b>	
direct	> 80 dB
effect (filter open, no reverb)	> 75 dB
<b>spring reverb</b>	
number of springs	3
reverb time	2.75 s - 4 s
<b>filter</b>	
modes	low pass, 24 dB; high pass 24 dB; band pass 12 dB
modulation source	envelope generator, envelope follower, CV, LFO
<b>LFO</b>	
frequency range	0.05 Hz - 300 Hz
waveforms	ascending and descending sawtooth, rectangle, sine, sample & hold, EG (envelope generator)
<b>envelope generator</b>	
Attack	1 ms - 10 s
Decay/Release	1 ms - 15 s
<b>Miscellaneous</b>	
Power Supply	external DC adapter with 12 volts / 1000 mA
Dimensions	about 26 cm x 14.5 cm x 8 cm
Weight	0,75 kg
optional Accessory	wooden side panels



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