

BD 101

ANALOG GATE/
DELAY

USER MANUAL



Dear KOMA User,

Analog delays have been a specialty in musicians’ effect artileries for a very long time. Being loved for their organic, physical sounds, these circuits deserve special attention.... The way analog delays work is very similar to the old fashioned way of extinguishing a fire by means of a bucket brigade transferring water from the water source to the fire, therefore called bucket brigade delays (BBD). In these BBD effects, the sound is literally ‘poured’ from one transistor into the next one. This process is clocked by a special bi-phase clock causing the first transistor to pass the signal to the second one exactly at the moment the second transistor just finished doing that to the third transistor and so on. Now imagine this procedure 2048 times in a row, and you have successfully delayed your signal by simple analog means!

Amplitude modulation and gating at its most extreme form, on the other hand, are maybe some of the oldest tools in musicians’ repertoire to express dynamics and tension in music with the tremolo of a violin possibly being the most classic example.

Now, the KOMA Elektronik BD101 brings these great tools together and takes it one step further. The bi-phase clock of the BBD circuit on the BD101 can go into ranges never intended by the inventors of these chips, allowing you to go from super short delay pulses with chorus and flanger like sounds to enormously cut-up soundscapes. If you clock the BBD transistors in such a slow speed that the first transistor actually misses a part of the incoming sound in one clock phase, you are able to rip the incoming signal completely apart. At times, it might even sound like digital bit crushing. Because the gating/amplitude modulation circuit is placed before the analog delay, it allows you to cut away portions of your sound before the signal reaches the delay. That gives you the possibility to put focus on certain parts of your sound, e.g. a certain snare drum sound in your drum loop.

OK, these were the basics, now get your pedal and make some noise!

All the best from Berlin,

The KOMA Elektronik Team

Wouter

Wouter Jaspers

Christian

Christian Zollner

Robert

Robert Kunz

Hayden

Hayden Moskowitz

Getting Started

1. UNPACK YOUR MACHINE

The package comes with the BD101 pedal, a +9VDC, 500mA, tip-negative power supply and this manual. Make sure that the power supply is rated for the line voltage of your country: 120 VAC for the USA, 220 VAC for Europe and most other countries.

2. CONNECT IT

Be sure your amp or mixer is turned off, then connect your instrument to the BD101 by using the AUDIO INPUT on the upper right of the patch bay. Connect the AUDIO OUT to your amp. or mixer.

3. SET UP THE BD101 TO A BASIC PATCH

Set all controls to a patch in basic settings.

4. POWER UP / BYPASS

Connect the BD101 power supply to the BD101 DC input on the backside of the pedal. Please wait to play for 5 seconds, so the unit can warm itself up.

5. SET LEVELS

Make sure the EFFECT ON/OFF indicator is OFF. Play your instrument and adjust the volume. Press the Bypass switch and the EFFECT ON/OFF indicator will turn green which means the effect is now active. If necessary, adjust the INPUT GAIN control to match the levels of the processed signal and the bypassed signal.

6. PLAY

Now go nuts.The most predictable results will come from playing single note riffs or melodies. This is especially true when the DELAY BLEND slider control is set to WET. You can use the Motion Controller to adjust the DELAY TIME, GATE SPEED, GATE AMOUNT and CYCLE. Be sure to read through the Control Voltage Theory section to understand all CV features and their usage.

Front Panel Connections & Controls

The patch bay consists of ten 1/4” jack sockets that you can use for receiving and sending various audio or control voltage signals. Blank arrows mark CV inputs/outputs, black arrows mark audio inputs/outputs. If the arrow is pointing towards the jack socket, it shows you that this is an output. If the arrow is pointing away from the jack socket, it is an input.

All CV inputs in KOMA Elektronik pedals accept bi-polar control voltages. Since the pedal runs on +9V every time you plug in a control voltage to one of the CV accepting inputs, the respective knob (e.g. SPEED knob or SPEED IN (CV input) determines the offset voltage of your CV input signal.

[Audio Output] **CYCLE OUT** ①

This output provides the audio signal after the delay section, before the DELAY BLEND slider. Send this output to an external effect and plug the processed signal back into the CYCLE IN (audio input) to control the sound of the feedback. The volume of this signal is determined by the CYCLE control.

[CV Input] **CYCLE IN** ⑤

This CV input accepts control voltages from 0 – 9V, affecting the amount of feedback in the delay section. The CYCLE knob determines the offset voltage.

⑥ **EXT. GATE** [CV Input]

Goes directly to the VCA, controlling the amount of amplitude modulation/gate, bypasses the SPEED and AMOUNT controls.

⑦ **CYCLE IN** [Audio Input]

The sound source plugged in here will arrive at the feedback insert point of the BD101 delay section. Use this insert point together with the CYCLE OUT to change the behaviour/sound of your feedback cycle. The internal feedback circuit is broken by plugging into this jack.

[CV Input] **AMOUNT** ②

Controls the amount of amplitude modulation/gate applied to the incoming audio signal. The AMOUNT control determines the offset voltage.

[Audio Output] **AUDIO OUT** ③

The main audio output of the BD101

[CV Input] **SPEED** ④

Sets the speed of the LFO that controls the amplitude modulation. If turned fully counter clockwise, the speed is slowest. If fully clockwise, it is fastest.

SPEED A

Controls the speed of the amplitude modulation/gate LFO. The SPEED control determines the offset voltage.

AMOUNT B

Chooses the impact of the gate/ amplitude modulation section. When turned fully counter clockwise the input signal isn't affected by the LFO. When fully clockwise, it completely gates the signal.

SHAPE C

Sets the shape of the amplitude modulation/gate, selecting either ramp, square or sawtooth.

FOOTSWITCH D

Heavy duty Alpha foot switch turning the effect on and off. When the effect is turned off, the signal will be passed through without being affected, true bypass!

INPUT GAIN E

Adjusts gain for boosting low level input signals. By sliding from left to right you can boost your signal from 0 gain to 100 gain (0 to +20dB).

F **DELAY BLEND**

Choose how much of the delay signal is applied to the input signal. The slider is an equal-power panning slider meaning that it can go from completely dry - no delay signal at all - to completely wet - only delayed signal - with no gain loss over the whole range of the slider.

⑧ **DLY TIME** [CV Input]

Controls the delay time of the delay circuit. The TIME control determines the offset voltage.

⑨ **AUDIO IN** [Audio Input]

This is the main audio input of the BD101

⑩ **SENSOR** [CV Output]

Output of the infrared motion sensor. The closer you move something towards the sensor, the higher the CV rises. Sensor output is 0-8V.

③ **CYCLE**

Controls the amount of delayed and amplitude modulation signal flowing back into the delay circuit, representing the amount of feedback in the delay circuit.

① **TIME**

Set fully clockwise, it will give a super short delay of 1ms. Turning it clockwise will give longer delay times. At around 100ms, there is a degradation of the overall sound comparable to digital bit crushing effects.

H **RANGE**

Chooses between three different speeds: low, mid, and high.

G **SENSOR**

Emits a CV signal that can be patched up with any CV receptive socket on KOMA products and i.e. your modular system. By moving your hand over the sensor you can control the parameters of the CV input patched to it.

Rear Panel Controls

Since the BD101 runs on a +9V power supply, we provide you with a trimmer for each CV input on the backside of the panel for CV signals over +/- 9V. So whenever you notice a significant distortion, clipping in your control signal waveform or strange CV behavior, simply turn the trim pot counter-clockwise until you hear your desired result. By turning it counter-clockwise, you attenuate the incoming CV signal. Fully counter-clockwise means that the incoming CV signal is completely gone, whereas fully clockwise means that the incoming CV signal is arriving to the circuit unattenuated.

SENSOR CV OUT

Adjust the sensitivity of the motion controller.

SPEED CV IN

Attenuates the incoming CV signal.

DLY TIME CV IN

Attenuates the incoming CV signal.

AMOUNT CV IN

Attenuates the incoming CV signal.

CYCLE CV IN

Attenuates the incoming CV signal.

DC POWER CONNECTOR

Use only KOMA PSU to ensure high quality performance.

Imprint

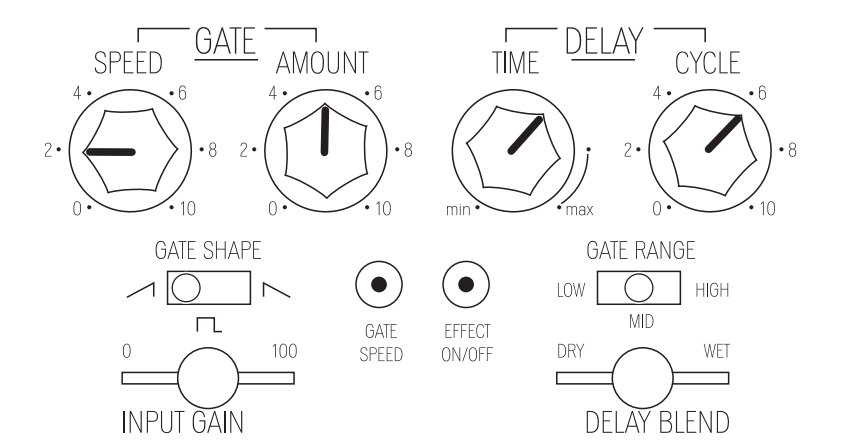
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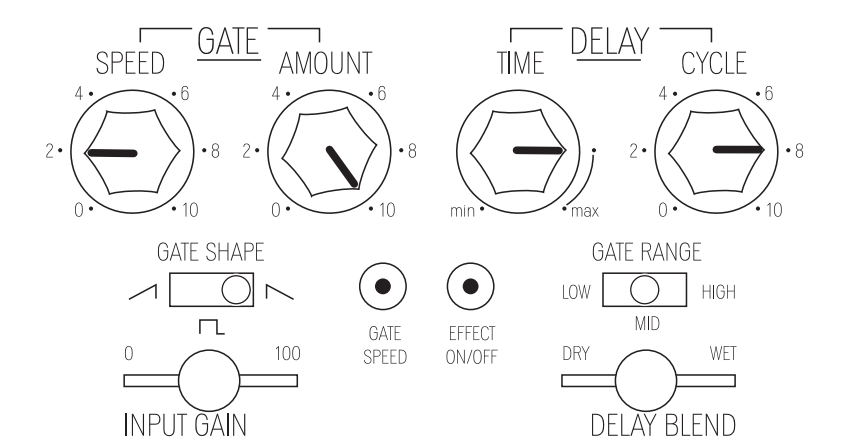
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Basic Settings



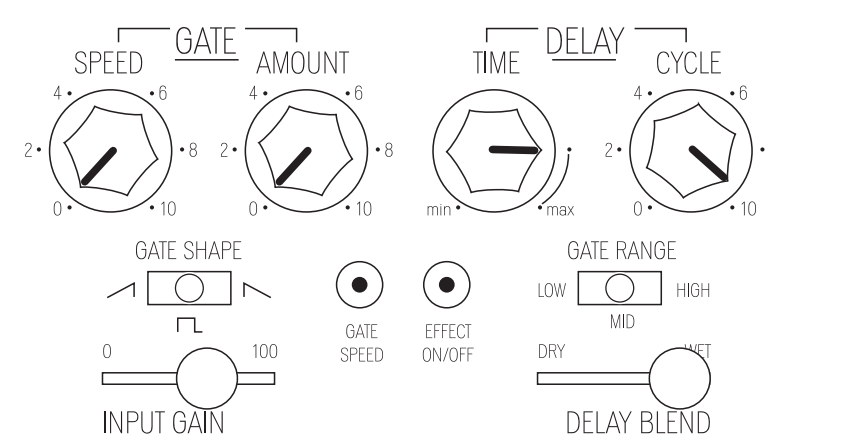
METALLIC FLANGER

With shorter delay times, flanger and chorus like sounds can be achieved.



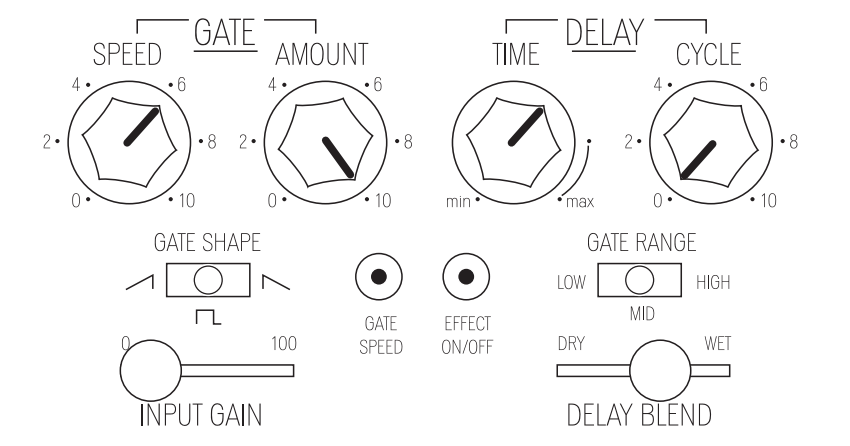
RHYTHMIC ECHO

The gate and delay time work together to create some rhythmic effects.



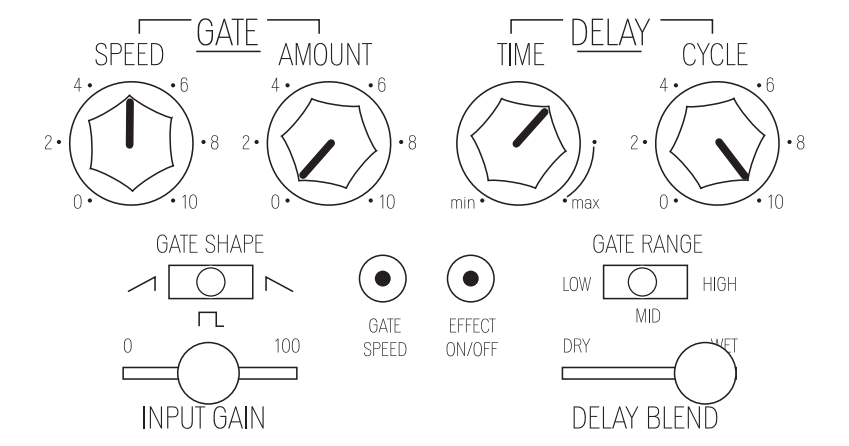
BITCRUSHER

The longer delay time creates a bit crushing type of effect.



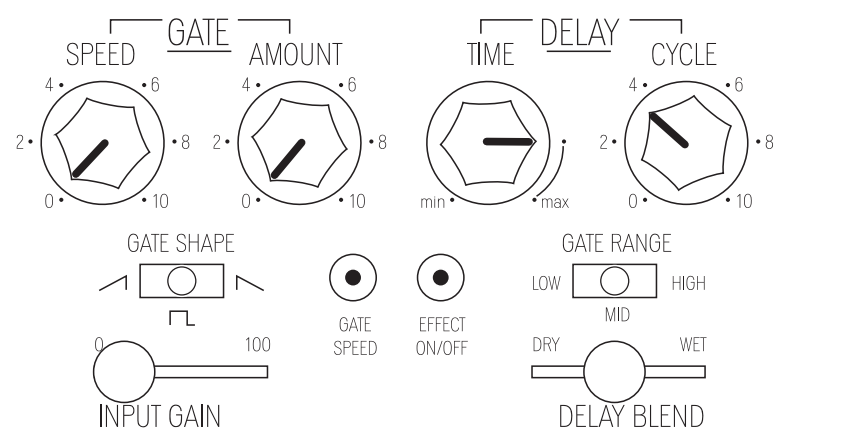
CHOPPED SOUND

The full gate chops the sound according to the speed set.



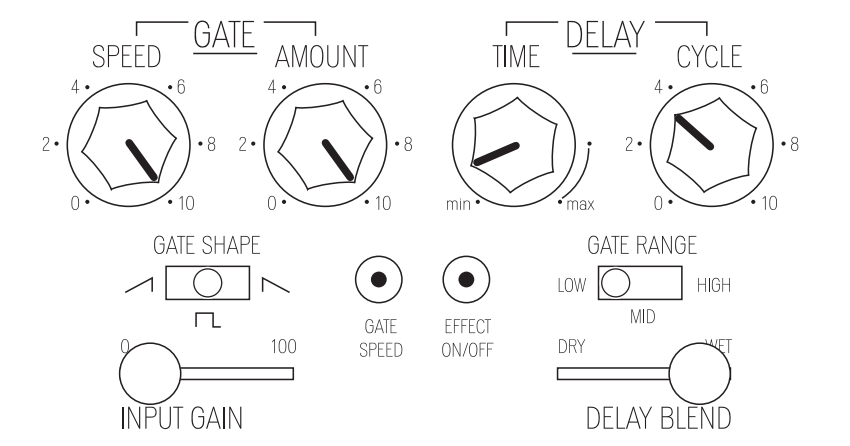
FEEDBACK OSCILLATOR

Turn up cycle and use the BD101 as an evolving noise source, just watch your volume! Take the SENSOR output into the DLY TIME CV input to control the pitch.



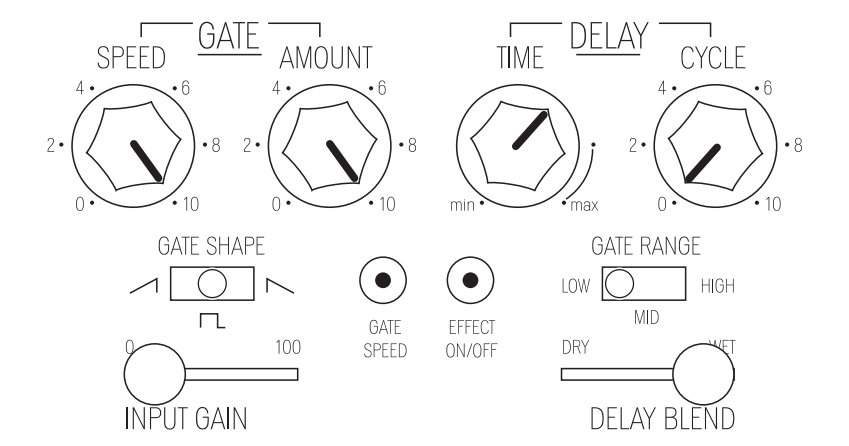
CLASSIC ANALOG DELAY

Get “normal” type of delay sounds too!



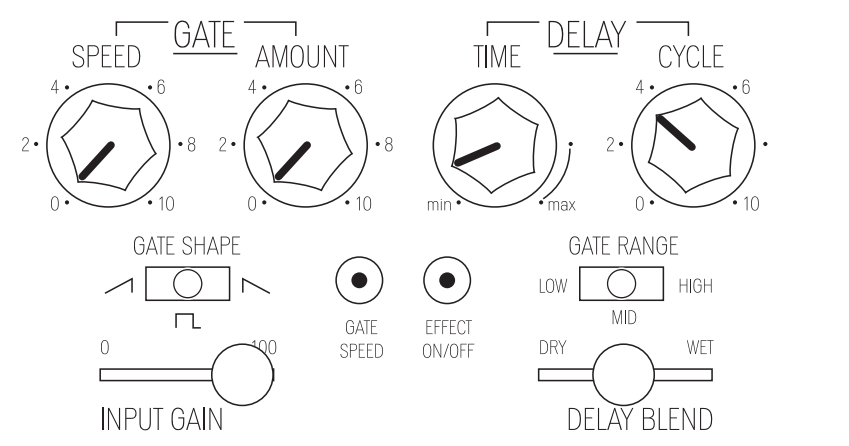
FAST GATE, SHORT DELAY

Add a short echo to your now staccato sound.



COMPLETELY RIPPED APART

This stronger gate combined with being fully wet really mangles the sound.



KARPLUS

Input a staccato sound to create a plucked string effect.

Tips & Tricks

LINEAR PSU

To ensure the best sound quality we recommend using a linear power supply at all times. Because the sensor circuit needs a lot of current, we recommend a minimum of 500mA. Since it's a linear power supply, not switching, make sure the power supply is rated for the line voltage of your country: 120 VAC for the USA, 220 VAC for Europe and most other countries.

LOWPASS FILTER

Inside the pedal you will find the option to activate a low pass filter after the delay section to make it more suitable for low impedance instruments (electric guitars etc.). Unscrew the 4 screws on the bottom, and you will see 2 green printed circuit boards (PCBs). On the PCB that contains the potentiometers and sliders, you will find a text on the left that reads “Lowpass Filter” with a line pointing towards two pins. Put the little jumper that was shipped with the BD101 onto the 2 pins to activate the low pass filter. We like it crazy, that's why we left the jumper off, but it will improve the overall sound of the BD101 when used with a guitar.

HOW TO CLEAN YOUR BD101

The BD101's body is white, which means the chance of it becoming dirty after a show or intense studio session is high. To clean the pedal, use some pure cleaning alcohol (e.g. isopropyl). Make sure you use it safely, that stuff is pretty flammable. Also make sure there is no solvent mixed in, this will remove the screen printing on the pedal.

Features

When the audio signal is plugged into the AUDIO INPUT jack, it first arrives at the analog gate / amplitude modulation section where you can choose how you want to prepare your signal.

In the DELAY section, the further you turn the TIME knob clockwise the harsher, noisier and more audible the effect will become. This pseudo-bit crushing effect is a side effect of clocking the BBD chips slower than it is actually intended to be (see introductory notes about analog delay chips). Also, be aware of the fact that the clock of the BBD chip used in the BD101 will appear as a function of your input signal, sitting on top of your waves. We don't consider this as a bug or malfunction but think that whoever is brave enough to turn the TIME knob further than 100ms will either not care about this side effect or love its sound as we do at KOMA Elektronik

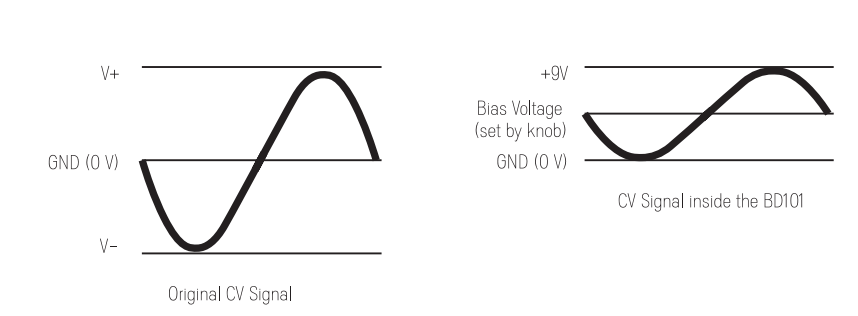
One of the features on your BD101 you won't find in any other pedal is the possibility to control the features of the pedals with the on board motion controller. Since it works with infrared LEDs we call it the SENSOR. The motion controller can be used in many different ways. For more information about Control Voltage, check out the section Control Voltage Theory of this manual.

CV Theory

The concept of control voltage (CV) is not difficult to understand: instead of turning a knob on your pedal, you simply connect a voltage – the control voltage – to the corresponding CV input that does the job for you. For example, if you want to have quickly varying GATE AMOUNT, you don't have to turn that knob back and forth rapidly until your fingers fall off but simply connect an alternating CV to the AMOUNT CV input.

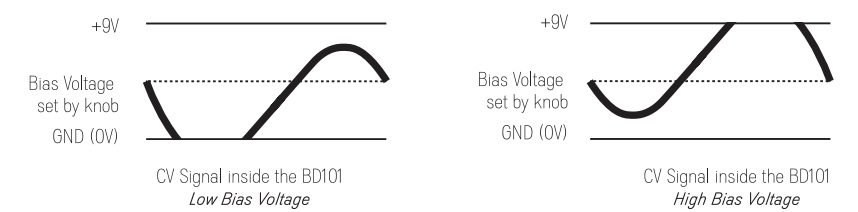
You can take control signals from any source for controlling the inputs of the BD101. All of the CV inputs theoretically accept control voltages from -100V to +100V though a range from -5V/-12V/-15V to +5V/+12V/+15V is more common and usable.

BIPOLAR CV SIGNALS



The incoming bipolar CV signal is shifted around the voltage that you select with the corresponding knob. Example: if you insert a -5V to a +5V sine wave into the CYCLE CV jack you will get the following results while turning the CYCLE knob:

BIPOLAR CV SIGNALS



A similar thing happens to unipolar CV signals: their point of origin (0V) is shifted by the amount set with the corresponding knob. In other words: you add the voltage of your knob to the voltage of your incoming unipolar CV signal.

UNIPOLAR CV SIGNALS



Technical Specs

CASING

Powder coated aluminum casing, silk screened text and wooden side panels.

DIMENSIONS

23 cm x 15 cm x 5 cm (L x W x H) / 9" x 6" x 2" (L x W x H).

NET. WEIGHT

850 gr / 1.8 lb.

SHIPPING WEIGHT

1 kg. / 3.0 lb including power adapter and instruction manual.

POWER REQUIREMENTS

9V DC power adapter, 500mA min, center polarity negative (only use the KOMA adapter shipped with the pedal).

Warranty

KOMA Elektronik warrants its products to be free of defects in materials / workmanship and conforming to specifications at the time of shipment for a period of two years from the date of purchase. During the warranty period any defective products will be repaired or replaced at KOMA Elektronik's option on a return-to-factory basis. This warranty covers defects that KOMA Elektronik determines are no fault of the user.

RETURNING YOUR PRODUCT?

You must obtain prior approval in the form of a RMA (Return Material Authorization) number from KOMA Elektronik before returning any product. Email us at support@koma-elektronik.com to request the RMA number. All products must be packed carefully and shipped with the KOMA Elektronik supplied power adapter. Sorry, the warranty will not be honored if the product is not properly packed. Once you have received the RMA#, write it on the box together with the word: WARENRUCKSENDUNG and carefully pack your product, ship the product to KOMA Elektronik with transportation and insurance charges paid, and include your return shipping address.

WHAT WILL WE DO?

Once received, we will examine the product for any obvious signs of user abuse or damage as a result of transport. If the product has been abused, damaged in transit, or is out of warranty, we will contact you with an estimate of the repair cost. Warranty work will be performed and KOMA Elektronik will ship and insure your product to your address free of charge.

HOW TO INITIATE YOUR WARRANTY?

Please initiate your warranty online by sending an email to support@koma-elektronik.com!