

# B TIMBER



**BASTL**  
**INSTRUMENTS**

# TIMBER

## Introduction

Timber is a very flexible wave-shaping module that can produce rich timbres by adding harmonics to simple waveforms (triangle and sine waves) or any other signal.

It has 2 different unique wave-shaping circuits:

- I. the WAVE DRIVER (left side of the module)
- II. the WAVE FOLDER (right side).

These circuits are accompanied by a voltage-controlled crossfader to fade between the different circuits or between one of them and the clean input signal.

Both circuits share the same control voltages: SHAPE sets the input amplification before the wave shaping circuit, and SYMMETRY control adds voltage offset to the input signal to provide various asymmetric overdrives or wave folding sounds.

There is also a FBK CV jack which, when provided with positive voltages, feeds respective portions of the output signal back to the input, which results in chaotic and aggressive behaviors. It is calibrated to work well with 5V gate voltages.

## **I. WAVE DRIVER**

is an overdrive circuit with one folding stage, and it has two 3-way configuration switches (9 different configurations).

The DRIVE switch can set the overdrive character to SOFT, HARD, or something in between.

The FOLD switch can set the folding threshold to HI or LO or it can turn the folding stage off in the NO position.

## **II. WAVE FOLDER**

is a novel take on the Serge-style wave folding circuit which cleverly uses the high gain of the input amplification stage to provide rich high-frequency timbres with higher settings of the SHAPE parameter.

It has a configuration switch to access clean 4 stage wavefolding in the OK position or highly asymmetric folding stage in the KO position, which provides a strange metallic character. The NO position provides only the very last overdrive-folding stage.

## **X-FADE**

is a voltage-controlled crossfader, present to provide blending between different wave-shaping circuits or to work as a dry/wet kind of control.

With complex waveshaping, the fundamental bass frequencies often get transformed into higher harmonics, so it comes in handy to be able to mix in a bit of the original signal.

# **dual waveform lumberjack**

# Features

- I. WAVE DRIVER is an overdrive circuit with one folding stage.
  - 3-way DRIVE SWITCH to set the character of the overdrive (SOFT-MID-HARD)
  - 3-way FOLD SWITCH to configure the folding threshold level (LO-NO-HI)
  - independent output I. OUT
- II. WAVE FOLDER is a 4-stage wave-folding circuit
  - 3-way FOLD SWITCH to set the character of the folding stages (OK-NO-KO)
  - independent output II. OUT
- common INPUT for both circuits
- SHAPE sets input amplification before the signal enters the waveshaping stages
- SYMMETRY adds voltage offset to the input signal
- SYMMETRY becomes a bipolar attenuator when the jack is connected
- X-FADE voltage-controlled crossfader with a bipolar attenuator
- switch to select between INPUT and I. WAVE DRIVER for the left side of the X-FADE
- X-FADE IN jack breaks the normalization of the II. WAVE FOLDER on the right side of the X-FADE
- voltage at the FBK CV jack sends signals from the output or II. WAVE FOLDER back to the INPUT

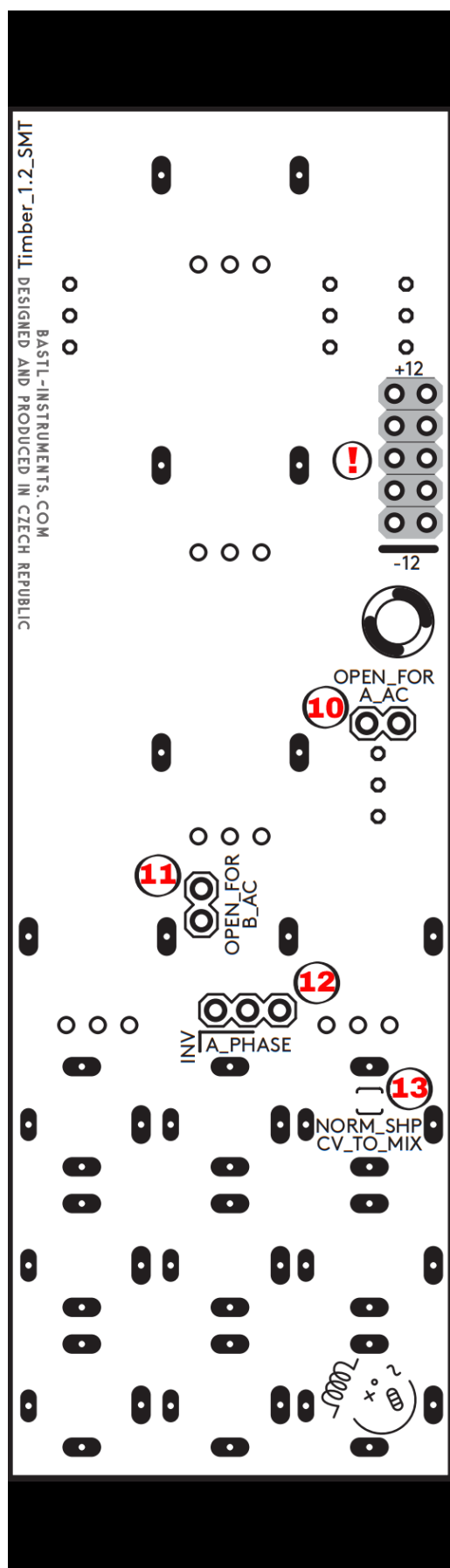
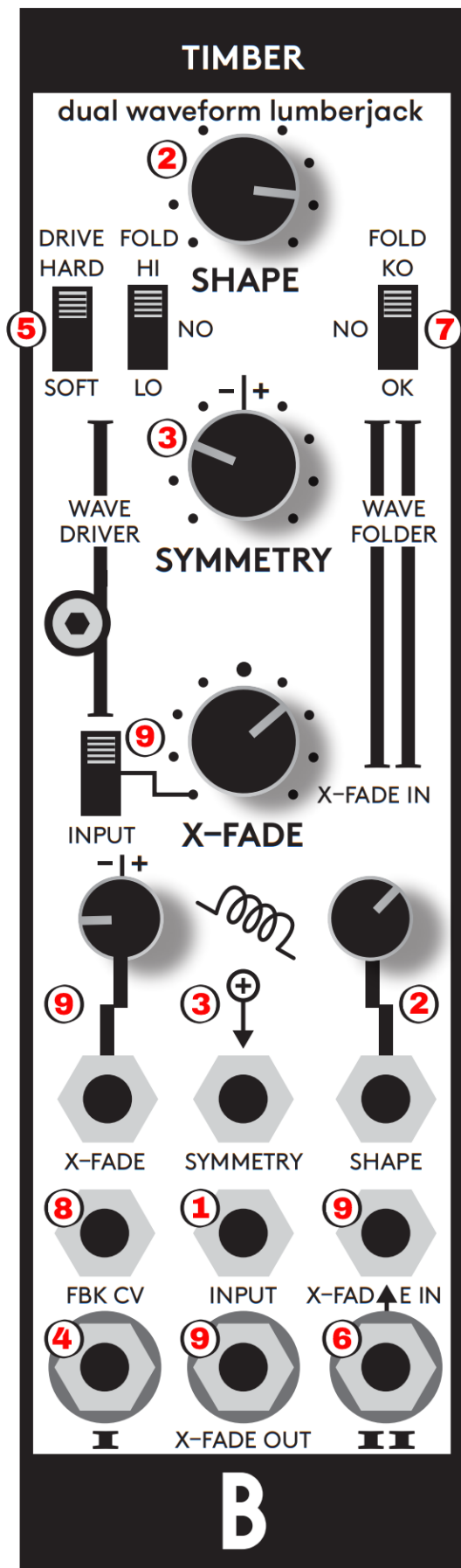
# Technical details

- 7 HP
- PTC fuse and diode-protected 10-pin power connector
- 24mm deep
- power consumption: +12V: <50mA; -12V: <50 mA

# TIMBER

## PANEL

## PCB



# Power

Before connecting the ribbon cable to this module, disconnect your system from power! Double-check the polarity of the ribbon cable and that it is not misaligned in any direction. The red wire should match the -12V rail both on the module and the bus board.

## **! please make sure of the following**

- you have a standard pinout eurorack bus board
- you have +12V and -12V rails on your bus board
- the power rails are not overloaded by current

Although there are protection circuits on this device, we do not accept any responsibility for damages caused by the wrong power supply connection.

After you've connected everything, double-checked it, and closed your system (so no power lines can be touched by hand), turn on your system and test the module.



# Controls

## (1) Input

is sent to the amplification stage (SHAPE) and mixed with voltage offset (SYMMETRY) and then to the two different wave-shaping circuits.

## (2) Shape

is the amount of amplification of the input signal before it is inserted into the wave shaping stages. The first few degrees of the knob act as a regular VCA then the shaping is applied.

CV at the SHAPE jack is attenuated and combined with the SHAPE knob.

## (3) Symmetry

sets the amount of voltage offset added to the input signal. When a signal is inserted into the SYMMETRY jack, the SYMMETRY knob acts as an attenuverter for that signal. When nothing is plugged into the SYMMETRY jack, it adds either positive (CW) or negative (CCW) voltage to the input signal.

SYMMETRY can be used with slow CV signals (PWM-ish character) or faster LFOs (pseudo chorus sound with wave folding), or it can be used to mix any second signals at the INPUT of the module.

You can also take the output of one of the waveshapers (I. or II.) and connect it to the SYMMETRY jack to get control over the amount of positive or negative feedback. In such a configuration, the module might self-oscillate in certain settings.



## **(4) I. Wave Driver Output**

is an independent output of the I. WAVE DRIVER wave shaping stage. The signal in the I. WAVE DRIVER circuit first goes thru one wave folding stage (similar to the OK position of the II. WAVE FOLDER) with an adjustable folding threshold and then thru the configurable overdrive stage.

Adding voltage to the input with SYMMETRY will result in asymmetric distortions typical for tube amps and very musical.

Adding a lot of SYMMETRY while using the folding stage can result in high-pass characters and the elimination of the fundamental frequency.

## **(5) I. Wave Driver Switches**

The DRIVE switch has 3 positions and can set the overdrive character to SOFT, HARD or something in between. This can also distort waveforms when using the wave driver to perform wave folding.

The FOLD switch can set the folding threshold to HI or LO or turn the folding stage completely off in the NO position. The HI position sets the threshold for folding precisely twice as high as the folding threshold of the II. WAVE FOLDER circuit, which can be used to obtain different harmonics at the respective outputs. Let's say SHAPE is set so that the II. WAVE FOLDER folds the waveform twice (5th harmonic).

At this point, with the FOLD switch on HI and the DRIVE switch on the mid setting, there should be only one fold at the I. WAVE DRIVER output obtaining the 3rd harmonic. When SYMMETRY is applied, it is also possible to obtain the 2nd and 4th harmonic or the 2nd and 3rd harmonic simultaneously at the respective outputs.



## **(6) II. Wave Folder Output**

is an independent output of the II. WAVE FOLDER wave shaping circuit. See II. WAVE FOLDER SWITCH for more details about the circuit.

## **(7) II. Wave Folder Switch**

When a signal is amplified at the input of this circuit, it passes thru 5 stages. The first 4 are wave folding stages.

When the signal is amplified and reaches the folding threshold, the peak that surpasses that threshold is folded inwards. So instead of overdriving, it makes the waveform go downwards, instead of upwards.

With further amplification, these peaks reach the bottom threshold of the second stage and fold upwards again and so on through further stages.

This can happen symmetrically for both positive and negative thresholds with the FOLD switch in the OK position and the SYMMETRY knob in the center.

With simple waveforms, such as triangle or sine waves, this results in the introduction of the 3rd, 5th, and 7th harmonic and further into sharp distortion. Sweeping the SHAPE would have a similar feel to tweaking the cutoff knob on a filter.

Adding voltage to the input with SYMMETRY will result in asymmetric folding; therefore, the 2nd, 4th, and 6th harmonic can be obtained with the right portion of SHAPE and SYMMETRY.

Setting the FOLD switch to the NO position will result in skipping the 4 wave folding stages and using only the last folding/overdrive stage. This is especially useful when processing more complex signals.

Setting the FOLD switch in the KO position will make the folding stages strangely asymmetrical by default and result in unique fuzzy metallic sounds.

The wave folding can result in losing the power of the fundamental folded frequency; therefore, the X-FADE section is valuable for blending between the folded signal and the original or the overdriven signal, which keeps the fundamental frequency. Such use is more similar to a low-pass filter rather than band-pass filter character for simple waveforms.

## **(8) FBK CV**

Voltage-controlled feedback can be obtained by applying a voltage at the FBK CV jack. That takes a portion of the II. WAVE FOLDER signal to be mixed with the input signal.

Especially with the FOLD switch in the OK position, this will result in chaotically aggressive timbres. It can also force the module to self-oscillate or produce chaotic noises.

The input works great with 5V gates or envelopes. With higher amounts of SYMMETRY applied, it can multiply the voltage offset and make the signal go quieter in a specific way.

This can be very useful when combined with more complex rhythmic modulations.

## **(9) X-Fade**

The voltage controlled crossfader X-FADE is useful for combining the two waveshapers and blending the wave shaped signal with the input signal.

The X-FADE knob adjusts the mix balance of the signals at the X-FADE output.

In the full left position, the X-FADE outputs either the unmodified INPUT signal or the I. WAVE DRIVER signal, depending on the position of the SWITCH next to the knob.

With the X-FADE knob in the full right position, the X-FADE outputs the signal that is present at the X-FADE IN jack.

When nothing is plugged into the X-FADE IN jack, the II. WAVE FOLDER signal is normalized there. With unrelated signals in, it can provide an independent crossfade function.

**Tip:** Plug the I. WAVE DRIVER output to the X-FADE IN and set the X-FADE switch to the INPUT position to crossfade between the clean signal and the signal influenced by the I. WAVE DRIVER.

The X-FADE CV input goes thru the attenuverter KNOB, which will mute the voltage in the middle position and either add (if turned clockwise) or subtract (if turned counterclockwise) that voltage from the position of the X-FADE knob.

This allows a positive envelope to crossfade in any direction between any combination of signals.

## **(10) (11) Open For A AC & Open For B AC**

The A AC jumper is specific to the I. WAVE DRIVER and the B AC jumper to the II. WAVE FOLDER.

These jumpers are closed by default and make the TIMBER DC coupled all the way from input to output. This means that it can (and should!) be used for processing slow voltage signals (sequences / LFOs / envelopes etc.).

However, adding SYMMETRY can result in a voltage offset at the output, which can present some issues when used within audio signal paths that are not AC coupled

(e.g., when connected outside of the Eurorack without an output module). In such situations, it is recommended to set these jumpers open.

## **(12) INV A Phase**

This jumper is used to invert the phase of the I. WAVE DRIVER. Crossfading between the two shapers could result in a high-pass character because the fundamental frequency would be canceled out by the phase inversion. This can be useful in some scenarios, but can be problematic in others.

## **(13) Norm SHP CV\_TO\_MIX**

Closing this jumper would normalize the SHAPE CV input voltage to the X-FADE CV input.

## **Application note**

Different types of source signals work best with different kinds of wave shaping. Simple waveforms sound great with more harmonic content added and therefore using the wave folding in either stage gives strong results. Complex signals such as acoustic instruments or drums already have a lot of higher harmonics which when multiplied by folding stages can become quite noisy.

Therefore, for such signals, more pleasing results may be obtained by applying overdrive rather than folding. There are no written rules for this process and ultimately the best techniques are those that sound best to the user. We advise the user to explore the many settings in conjunction with various kinds of input signals and modulation signals to experience the full potential of this powerful sound processor. Some combinations of signals and settings may show minimal results and some may sound less than pleasant but when a balance is struck, the outcome can be quite remarkable and loads of fun to explore...

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