

# Mutant Bassdrum

Thank you for your interest in the Mutant Bassdrum (MBD)! The MBD is a 13HP eurorack format synthesizer module available both as a ready-assembled module and a printed circuit/panel set you can build yourself if you have the skills.

## THE BASSDRUM

The MBD is really two modules in one: a feature-rich analogue bassdrum synthesis module and an aggressive voltage controlled distortion effect. The distortion features UV purple LEDs as hard clipping diodes and optocoupler-based voltage control of the distortion amount. The distortion can be used to process external signals at the same time as synthesizing percussive sounds.

## FEATURES

- entirely analogue bassdrum circuitry capable of vintage TR-808 sounds
- built in distortion effect (batteryACID topology) with modular level output levels
- distortion accepts external inputs when not being used with bassdrum (great for acid synth leads)
- voltage control of distortion amount
- voltage control of decay from short hits to long "ooooomphs"
- voltage control of pitch (not v/oct) from subsonic bass frequencies to high tom drum sounds
- non-invasive analogue vactrols used for voltage control, so, vintage sounds can still be had
- completely redesigned, hi-fi signal chain spares no expense by replacing cheap transistor amplifiers with low noise opamp equivalents
- dial in super hot, eurorack modular level output levels (up to 20Vp-p!)

### The Mutant Philosophy

There are already some really excellent clones of vintage gear out there in the modular world. The Mutant Drums were not made to try and fill that role. Although each Mutant began as a favourable classic drum topology, we wanted to create something modern and different, while still maintaining an analogue nature. Features like CV inputs and signal routing not found on classic analogue drum machines were incorporated to make the circuit a powerful creative tool in your modular synthesizer, rather than just transplanting a vintage drum circuit into your machine.

## TECHNICAL SPECIFICATIONS

**Width:** 13HP | **Depth:** 30mm  
**Current draw:** +55mA, -45mA @ 12V

### A little bit of technical stuff...

The MBD gets its organic sound from a twin-t damped sinewave oscillator just like the legendary TR-808 made famous. This seemingly simple circuit does a lot with very few components, and as such, the frequency of the oscillator by way of voltage control is costly to linearize. So don't expect perfect tuned musicality from the oscillator when using it like a synth voice! It is not volts/octave response, though it is approximately exponential. We used optocouplers (aka: vactrols) throughout this design so you may notice a slight amount of slew on the CV inputs' response. This is a natural effect of vactrol control and is nothing to be concerned about!

## BASSDRUM CONTROLS

### TONE CONTROL

This control works like a lowpass filter on the bassdrum. Having the control UP allows more high frequencies through and makes the bassdrum more pronounced and punchy sounding while having it turned DOWN will soften the bassdrum's character.

### DECAY CONTROL

This control adjusts the decay of the bassdrum from short to long and can be voltage controlled by plugging in a signal to the DECAY CV input.

While not shown on the image to the right here, production modules have an ADJUSTMENT SCREW below the DECAY control knob on the panel. Use a small screwdriver to adjust the maximum decay of the control to your taste. Too much decay and the bassdrum will SELF OSCILLATE. This is desired some people but not by others, so we decided it would be best to offer you the ability to easily adjust this parameter to your liking. So, experiment with it until you like the response!



### BD LVL CONTROL

This control adjusts the volume of the bassdrum at the CLEAN output. If using the DISTORTION, this control adjusts the volume *before the signal arrives at DIST IN*.

### CLEAN OUTPUT

The clean bassdrum signal appears at this output. This is a modular level output and can produce very HOT signals (up to 20V peak-to-peak). The ENV indicator LED beside it will light along with the intensity of the bassdrum sound you are generating.

### PITCH CONTROL

The bassdrum's fundamental frequency can be altered by using this control. The frequency can be adjusted from subsonic to frequencies high enough for a full range of tom drums. The adjustment range is approximately 2 octaves and varies from module to module due to component tolerance (just like the classic machines!). The pitch can be varied by the PITCH CV input using voltage control. Please note that the input is NOT v/oct though you will find it has a *near* exponential response. The amount of PITCH CV can be ATTENUATED by the PITCH CV knob.

### TRIG INPUT

This input has an approximately 1V trigger threshold and activates the bassdrum when that threshold is met. Almost any signal can be used here as long as it goes all the way back down to 0V and up again with each repetition.

### ACC INPUT

This is the ACCENT input. Applying a 0-5V signal here will vary the ACCENT amount of the bassdrum from least (0V) to most (5V). ACCENT varies the volume of the bassdrum as well as makes the attack of the sound more aggressive when at maximum.

When nothing is plugged into the ACC INPUT, the ACCENT defaults to either minimum or maximum ACCENT based on the jumper setting on the back of the module. To change whether the input is pulled up (MAXIMUM) or down (MINIMUM) by default, turn off the power to your modular and remove the module from your case so you can move the jumper on the back of the PCB to the desired setting.

## **DISTORTION CONTROLS**

### **DIST IN**

This is the input for the DISTORTION effect. When nothing is plugged into this jack, the CLEAN output of the bassdrum generator is normalized to it. You can break that internal connection and process other signals with the DISTORTION effect by plugging something else into the DIST IN jack.

### **DIST IN LVL**

This control adjusts the volume of the signal into the DISTORTION effect. Use it to reduce the level of loud signals for processing.

### **DIST CONTROL**

The amount of DISTORTION can be varied via this control. This control adjusts the gain of the high gain stage driving the distortion clippers. At maximum setting, there is THOUSANDS of times signal gain, and thus, you may encounter some noise depending on your input signal levels! This is totally normal. The DISTORTION amount can be varied by voltage control by plugging a CV signal into the DIST CV input.

As you vary the DISTORTION amount with this control/CV input you will notice the DIST indicator LED near the DIST OUTPUT jack light up. When this LED lights up, distortion is occurring. This LED serves as a visual indicator for the severity of DISTORTION you are introducing to the signal.

### **DIST OUTPUT**

The output signal from the DISTORTION effect appears here. This output can produce extremely hot modular levels just like the CLEAN output.