

# 6m0d6 by LPZW & Tubbutec

## User manual



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# Introduction

6m0md6 is based on the famous TR-606 and indeed can sound like one, but it is so much more.

With the turn of a knob you can explore completely new soundscapes ranging from organic retro drum sounds to industrial sound effects – while still maintaining that ‘606’ feel.

Seamlessly blend between a 606 bass drum to a decayed 808 sub-bass, tune and damp your Cymbal or just cut it into pieces and beat it with a monkey wrench.

Tired of the normal snare sound? Why not replace it with a bit-crushed version of Indy fighting foes with his whip in a cave?

Dynamic triggers, additional CV controls, MIDI control and individual outputs add the finishing touches to this versatile drum module.

6m0d6 includes all seven TR-606 instruments:

Bass Drum, Snare, Low and High Tom, Cymbal, Open and Closed Hihats.

The original 606 circuits were replicated and modified with additional parameters. However, we made sure that each instrument can be set to sound like the original.

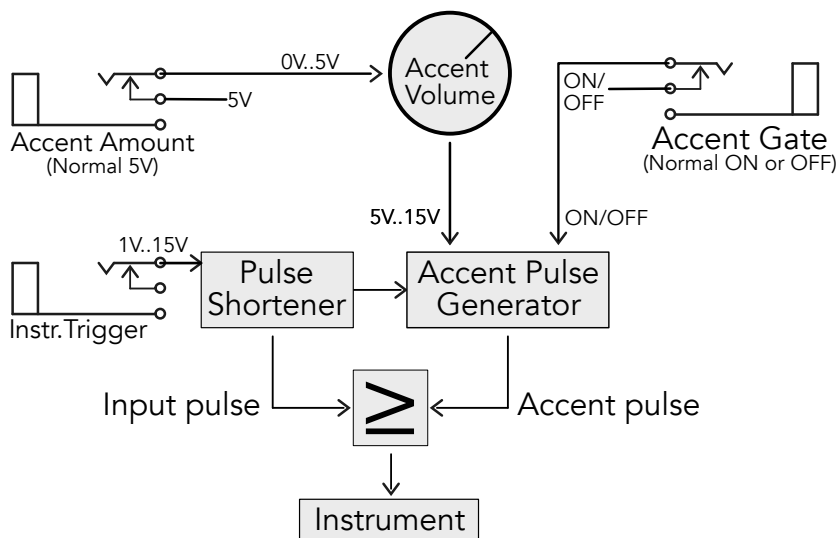
These settings are marked on the front panel for convenience.

## Feature List

- All original 606 sounds, analogue
- Many additional parameters for each sound
- Multiple trigger, accent and volume modes
- Advanced metal and noise sound control
- Multiple outputs and mix output
- CV control for multiple parameters
- MIDI input for drum trigger and sound control
- Compatible with Tubbutec 6equencer via LINK
- Eurorack, 3U, 24HP, 25mm depth, weight: 350g

## Triggers, Accent and Volume

6m0d6 instruments are triggered via the 7 trigger inputs. Additionally an Accent Gate input, An Accent CV input and an Accent Amount pot are available. Combined, multiple Trigger, Accent and Volume control modes are possible.



Here is the signal flow diagram for triggers and accent.

In the original 606, triggers have an amplitude of 5V, and accented triggers up to 15V. 6m0d6 accepts trigger voltages down to 1V. Depending on the amplitude of the triggers, not only the instruments volumes, but also their sound will change – just like a real drum kit.

The Accent Amount input is normalised to 5V and the Accent gate input to ON or OFF depending on a setting in the config menu (default is ON).

If not cable is plugged in, these settings will be used.

6m0d6 includes many ways to dynamically control instrument volumes allowing rich, natural drum patterns. These are determined by the trigger input volume, The Accent Amount knob, Accent switch input and Accent CV input.

#### a) Normal volume control

If nothing is plugged into the Accent Amount and Accent Gate sockets, accent is continuously turned on with a level adjustable with the Accent Volume knob.

#### b) Accent Gating

Using the Accent Gate input, accent can be turned on and off by an external signal. When turned off, the amplitude is that of the incoming triggers, or 5V when playing over MIDI or LINK.

#### c) CV volume control

Using the Accent Amount input with a control voltage between 0V and 5V can control amount of accent and thus the volume when accent is turned on. Here, the Accent Volume knob acts as an attenuator for the external CV signal.

#### d) Dynamic triggers

Additionally, all instruments can be played dynamically. The inputs accept a range from 1V to 15V which allows much softer sounds than the original 606. If accent is turned on, the larger of the two triggers is used for the instrument.

This means in order to get the full dynamic range, Accent needs to be disabled. This can be accomplished by plugging a jack cable into the Accent input, setting the Accent Gate normalisation to OFF in the config menu or switching Accent ON and OFF using an external signal.

## Trigger lengths

Incoming triggers will be internally shortened to 1.2ms to ensure proper sounding instruments. Amplitude and shape of the triggers are maintained, however. For the cymbal, this pulse shaper can be disabled, allowing complete control of the Cymbal sound. Shorter pulses also sound interesting and are worth a try. Our MIDI velocity implementation uses shorter pulse lengths to create dynamics.

## Noise and Metal

The original 606 uses white noise for the Snare Drum and a 'Metal' sound for the Hihats and Cymbal. We added a third XOR ringmod sound source and you can select between all three sounds for each instrument.

The white noise is generated digitally and can be reduced in quality for extra lofi bit-crushing instruments. This can be controlled via the Noise Tune knob and with the N.Tune CV-input.

At the highest quality setting, the noise emulates the original 606 noise distribution and frequency spectrum using a DSP algorithm.

Cymbal and Hihats originally use a metal sound created by mixing six square-wave oscillators with specific frequencies. The parameter Metal Tune allows you to change the pitch of these oscillators up or down. With Metal Spread you can change the relative pitch of the oscillators. Turn the knob to the very left and all oscillators have the same pitch, in the middle you get the original pitch difference and from there you can increase the spread even more. Both parameters can also be controlled via CV inputs, the Tune CV is 1/Oct compatible, which means you can play the metal sound in tune.

And even more is possible via MIDI  
(See Midi chapter below)

## Outputs and Mixer

6m0d6 includes volume pots for each instrument with individual outputs and a mix output.

Instruments are available at the mix outputs as long as nothing is plugged into the individual outputs. Plugging into an individual output will remove said instrument from the mix output.

## Bass Drum

The 606 bass drum consists of two damped oscillators with fixed frequencies.

- **Tune:** Changes the pitch of oscillator 1, ranging from sub-bass to Tom frequencies.
- **Tone:** Crossfades between the two oscillators
- **Decay:** Adjusts the decay time of oscillator 1 from the original length up to several seconds.
- **Click:** Adds a short pulse to the bass drum, giving it more attack.

## Snare Drum

- **Tune:** Changes the pitch of the snare body sound
- **Snappy:** Adjusts the cutoff frequency of a high-pass filter on the snare part.
- **Decay:** Changes the decay of the snare sound. Both very short and very long decay times are possible.
- **Noise source:** Selects between the three noise sources (Noise, Metal and XOR) for the snare sound. Depending on the noise and metal settings, a wide range of sounds are possible.



## Low Tom and High Tom

The Toms are damped oscillators with a low-passed noise decay part that simulates reverb.

- **HT Tune:** Adjusts the pitch of the High Tom
- **LT Tune:** Adjusts the pitch of the Low Tom
- **Sub Tom:** Halves the pitch of the Low Tom and creates a sub-bass or second bass drum.
- **Noise amount:** Adjust the reverb amount from 0 to 2x the original. Changing the Noise Tune parameter can have huge effects on the character of the reverb and overall tom sound.

## Cymbal

The original 606 cymbal consists of two bandpass filtered parts with different filter frequency and different amplitude envelopes which are fed by the metal noise source.

- **Tune:** Changes the frequency of bandpass 1
- **Tone:** Crossfades between the two bandpass parts.
- **Decay:** Adjusts the decay of the cymbal/li>
- **Noise source:** Selects between the three noise sources (Noise, Metal and XOR) for the bandpasses. Depending on the noise and metal settings, a wide range of sounds are possible.
- **CY.Pulse:** Normally, signals coming into the trigger inputs are gated to 1.2ms length to make sure the proper drum sounds are produced. This behaviour can be turned off for the cymbal, allowing full control of the cymbal's volume, envelope and length. Effectively, this can turn the cymbal into a drone sound generator or even string-synthesizer.

## Open and Closed Hihat

The 606 hihats are created from a decaying, filtered metal sound. Open and closed hihats use different envelopes, but the same sound generation. The closed hihat cuts off the open hihat.

In the original 606, the open hihat decay is tempo dependent. With a faster clock, the hihat decays faster. This clock dependency is not necessary for 6m0d6 because the decay time can be manually set to the user's liking.

- **Swap:** Swaps the Open and Closed Hihats.
- **OH Decay:** Decay time of the Open Hihat.
- **CH Decay:** decay time of the Closed Hihat ranging from a short click to a long OH-like sound
- **Noise source:** Selects between the three noise sources (Noise, Metal and XOR) for the Hihat sound. Depending on the noise and metal settings, a wide range of sounds are possible.

## CV-inputs

Several parameters can be controlled via CV inputs. All inputs are bipolar and have a usable voltage range between -5V and +5V. They can accept voltages greater +/-12V without damage.

- **AC.AMT:** Controls volume or accented volume of the instrument. (see “Triggers, Accent and Volume”)
- **SN.Dec, CY.Dec, HH.Dec:** Control the decay of the Snare Drum, Cymbal and both Hihats.
- **Noise Tune:** Controls the Noise Tune parameter
- **Metal Tune:** Controls the tune of the metal sound. This input behaves in a 1V / Oct fashion, which makes it possible to play the metal sound like an instrument.
- **Metal Spread:** Controls the Metal Spread parameter

## LINK input and 6equencer

6m0d6 has a Tubbutec LINK interface on the back and can be directly connected to the Tubbutec 6equencer. When using the LINK interface, the 6equencer can trigger the instruments and Accent, without needing to patch the connections manually. The trigger inputs are normalised, plugging in a patch cable will disconnect an instrument from the LINK trigger and can be controlled from an external trigger source.

The 1U version of 6equencer has the same width as 6m0d6 and perfectly fits above or below, creating a complete drum machine.

## MIDI Input

MIDI input is provided by TRS MIDI. Both A and B types are supported automatically.

Midi can be used to trigger drum sounds, adjust parameters via MIDI CC and even play the metal sound like an instrument.

### Trigger drum sounds

On MIDI channel 10, the drum sounds and accent can be triggered. 6m0d6 used the standard MIDI drum mapping:

BD	SD	LT	HT	CY	OH	CH
35	38	45	50	49	46	42
B0	D1	A1	D2	C#2	A#1	F#1

Sending a velocity value of 127 (maximum), will result in a simultaneous accent trigger. Alternatively, the accent will be turned on as long as note 34 (A#1) is held.

Velocity amounts below 64 (half the velocity range) will result in shorter pulse lengths which reduces the volume of the instrument in interesting ways. This allows dynamic playing via midi and can be combined with accent via note 34 for even more expression.

The trigger inputs are normalized, plugging in a patch cable will disconnect an instrument from the MIDI trigger and can be controlled from an external trigger source.

## Play the metal sound

Sending notes on MIDI channel 1 allows you to play the six metal oscillators directly. This effectively turns the oscillators – and with them the Cymbal, Hihats and Snare Drum into a paraphonic six-voice synthesizer.

Metal tune and Spread still work. With Spread set to 0, all oscillators are in tune; increasing Spread will detune all oscillators.

This is quite a powerful feature. It allows you to turn your Cymbal into a string synthesizer, play melodies on the Snare and much more.

6m0d6 uses a ‘unison/share’ voice allocating scheme. This means, if only one note is pressed, all six oscillators will share this same note. This is the same as transposing the oscillators.

Pressing more notes will distribute them across the available oscillators until eventually all six are used. Pressing more than six notes and new notes will replace the ‘oldest’ note. The trigger inputs are normalised, plugging in a patch cable will disconnect an instrument from the MIDI trigger and can be controlled from an external trigger source.

## CC control

The following CC controller values are accepted:

32	33	34	35	36	37	38
SD Decay	CY Decay	OH Decay	CH Decay	Metal Pitch	Metal Spread	Noise Tune

Turn on/off pulse shapers:

39	40	41	42	43	44	45
BD Gate	SD Gate	CY Gate	LT Gate	HT Gate	OH Gate	CH Gate

The CCs for Decay, Pitch, Spread and Tune are bipolar with a center of 63 == no change and work in addition to the knobs and CV-inputs of the module.

The pulse shaper CC control can be used to turn shortening of external trigger pulses on or off, identical to the CY.Pulse button on the module. 0..63 = OFF, 64..127 = ON. Note that for some instruments (BD, TOMs,..) This can cause double triggers.

## Config Menu

In the config menu additional parameters can be changed, however currently it contains only one parameter.

### Entering the config menu

The config menu can be entered by pressing the CY.Pulse button for more than three seconds. The CY.Pulse LED will start blinking to indicate an active config menu.

### Exiting the config menu

To exit the config menu, press the CY-Pulse button again. Any changes to the configuration will be saved.

### Setting the Accent Gate normalisation

When config mode is active, the position of the M.Tune knob controls if Accent Gate is normalised to ON or OFF (See chapter 'Triggers, Accent and Volume' for details). Turn the knob to the left half to turn the normalised Accent OFF, turn it to the right half to turn it ON.

## Firmware Update

Firmware updates with more features and bugfixes are possible via midi. In case there are any updates, you can find the latest version on [tubbutec.de](http://tubbutec.de)

## Specifications

Eurorack, 3U, 24HP

Depth 25mm

Weight: 350g

Power consumption: +12V: 130mA, -12V: 30mA

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