

ALM-Ø15
'Akemie's Taiko'
- Operation Manual -
(v0.1)



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Introduction

'Akemie's Taiko' is an authentic complete FM synthesis based drum voice created using original Yamaha IC's. It builds on the same technology used in the mighty Akemie's Castle but in a more complete triggered voice form featuring both signal generation and envelope shaping.

The module provides CV and direct control over a number of FM parameters including algorithm selection, operator release envelopes, ratios, waveforms & feedback. This gives a massive range of unique sounds.

The voice is able to track 1 volt per octave allowing it to be used for melodic lines as well as percussion. Also optional 'frequency ramps' can be enabled for additional audio effects.

The drum voice includes a trigger input as well as accent and choke trigger inputs to add further expressive and rhythmic control.

Technical Specifications

- Supply: +/-12V
- Current Draw: +12V 70ma / -12V 30ma
- Size: 18 HP
- Depth: 32mm (including power header)

Background & Caveats

Akemie's Taiko uses a vintage 'new old stock' Yamaha YMF262 (aka OPL3) chip as a sound source and exposes operator parameters to both voltage and direct control. It is able to produce multiple voice 2 or 4 operator FM based sounds from 6 algorithms and 7 selectable waveforms. This is very similar in audio capability to the Yamaha DX100, DX21 or TX81Z synthesisers. The Taiko also takes some specific influence from the Simmons SDE drum module which was FM based.

Using an original chip gives a very authentic and special sound that has never been put under direct modular control before. This allows easy, fun and painless exploration of FM sounds that was not really possible with the heavy, menu bashing small-screen style of programming the FM synths of the 80s.

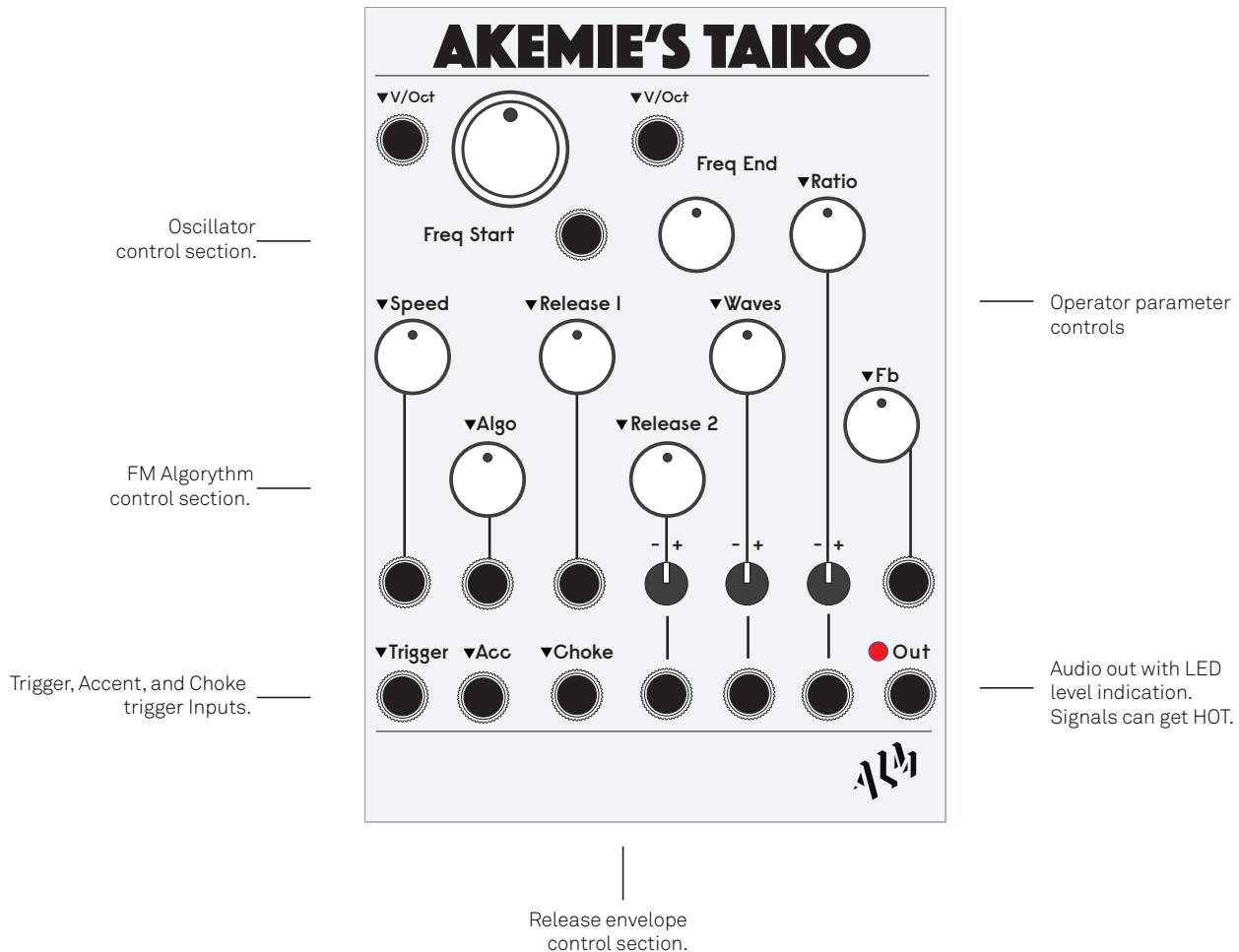
However, using an original chip imposes some limitations, some of which become more apparent with such direct control. Expect some 'stepiness' and potential low level clicks when changing certain parameters.

Also the chip produces a very low level high frequency tone - some attempt is made to filter this out, but not over aggressively as to change the modules overall tone. If this is unacceptable it is advised the output is low pass filtered or gated. A high quality power supply with plenty of headroom is also recommended.

Embrace and enjoy these limitations.

Core Operation

Panel Layout



Notes:

- All jacks are inputs expecting control voltages except the single audio output at lower right.
- All inputs expect 0-5v except attenuverted inputs +/-5v and V/Oct inputs which expect approx. 0-8v
- All inputs with an associated white knob have a separate attenuator (or attenuverter). The white knob acts as an offset to which any incoming control signals are combined with (post attenuation).

General Usage

Akemie's Taiko produces a percussive like 'hit' sound when a trigger signal (approx. +3v rising edge) is applied to the trigger input. The two other trigger inputs - Acc (Accent) and Choke - respectively either further emphasise the hit sound or immediately stop it in the presence of a trigger signal.

The actual 'hit' sound is defined by control knob positions and control voltage input levels. All white control knobs are offsets - any incoming control voltage is added to them. They do not attenuate incoming control signals. The 3 black 'thumb' pots allow for attenuversion (attenuation and/or inversion) of control signals for these inputs before being added to offsets set by the corresponding white control knobs.

The sound is generated via FM synthesis - a specific combination (aka algorithm) of oscillating waveforms (aka operators) cross modulating at differing frequency ratios over time at decreasing levels (release envelope). The base frequency, tracking 1 volt per octave, can be made to rise or fall (and roll over on itself) to a final end frequency with a set speed to produce 'siren' type sounds or further FM like modulation.

This maps to each control as follows

- **Algo** - Selects 1 of 6 operator algorithms, The initial 2 being 2 operator and the remainder 4 operator. (See appendix I)
- **Release 1** - Controls the release envelope curve of at least 1 operator from a few 10s of milliseconds to many minutes (16 discrete steps). See appendix I for operator mappings dependant of selected algorithm
- **Release 2** - Like Release 1 but for an 'opposing' operator - See appendix I for operator mappings
- **Waves** - Selects a specific combination of 8 different waveforms used by the operators for the selected algorithm. There are approximately 64 different combinations. See appendix I for available waveforms.
- **Ratio** - Controls the combination of integer frequency ratios used between operators. Generally increases ratios as knob is turned CW.

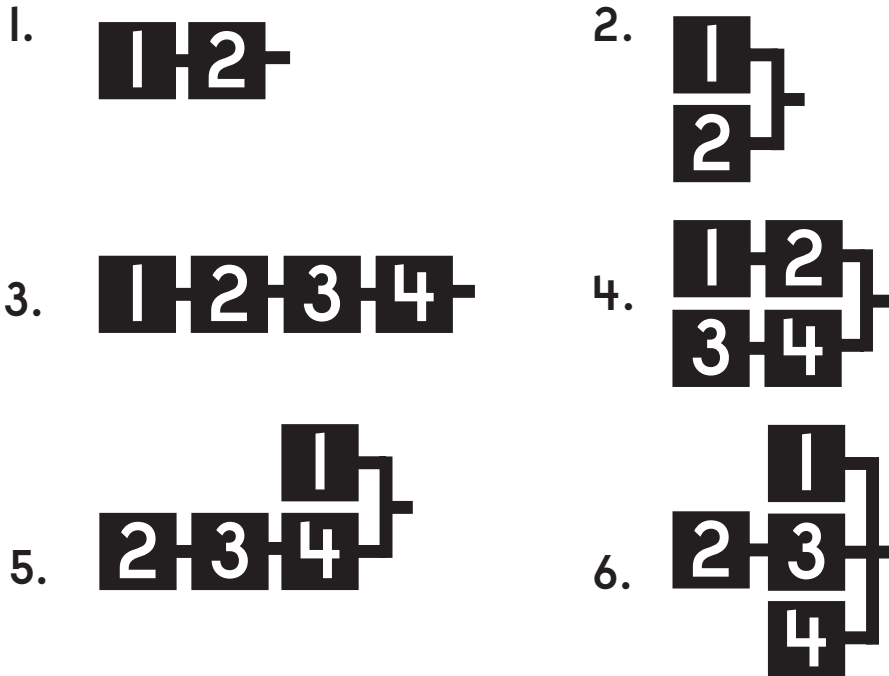
- **Fb** - Feedback on the first operator. Generally this can produce more percussive noisy sounds or have little effect in certain combinations. (0-7 range)
- **Freq Start** - The base frequency - this will track 1v/op (expect approx 5 octaves of tracking). The 'Thumb' knob allows for finer tuning. The tracking can be calibrated by adjusting the trimmer on the rear of the module (see Appendix II)
- **Speed** - Turning past approx 9pm makes base frequency move from the selected start frequency to the end frequency then resetting back again if the envelope is still open. Increasing values mean a faster transition.
- **Freq End** - The end frequency. Roughly tracks 1v per Octave.

All input and control values are 'snapshotted' when a trigger is received - once a drum hit is playing, the controls have no effect on its sound (the choke trigger input however does have an effect in stopping the sound). This includes the V/Oct input and means that a sequencer must set its CV before sending its gate for the Taiko to appear musically 'in sync' with the sequencer.

The Taiko has a very wide palette of available sounds. Modulating inputs really emphasises this and leads to interesting rhythms.

Appendix I: Reference

The 6 algorithms are as follows.

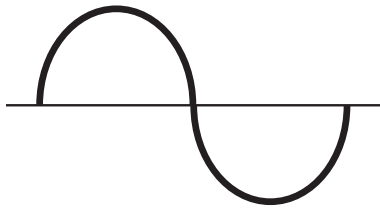


The release controls map to each operator as follows.

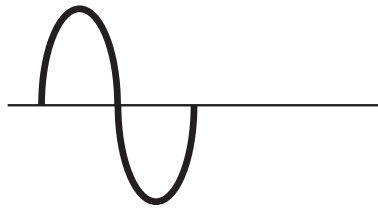
2 Operator ; Release 1 = 1, Release 2 = 2

4 Operator . Release 1 = 1 & 3 Release 2 = 2 & 4

Waveforms



1. Sine



5. Alternating (even) Sine



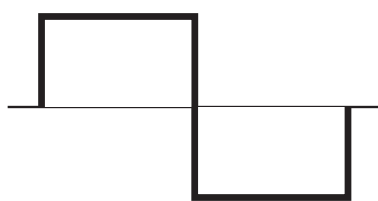
2. Half-Sine



6. 'Camel' Sine



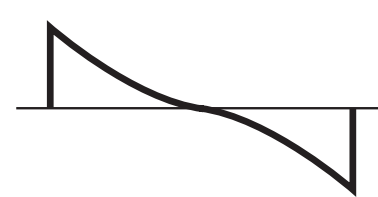
3. 'Abs' Sine



7. Square



4. Pulse Sine



8. logarithmic sawtooth /Derived Square

APPENDIX II: Calibration

Akemie's Taiko is pre-calibrated at the factory to accurately track 1 volt per octave on both VCOs. It should be accurate across approx 5 octaves.

Calibration is performed by carefully adjusting the trimmer on the back of the module. To calibrate, apply 1V to v/oct input of oscillator you want to adjust. Now tune the oscillator via front panel course and fine controls to C1. Next change the input voltage to 3V and now adjust trimmer on reverse until you get C3.

You may want to use a bigger or different voltage interval. You can use a Beasts Chalkboard as a stepped voltage source but you could also use a sequencer, offset through quantiser, offset with a multi-meter etc.

Limited Warranty

From the date of manufacture this device is guaranteed for a period of 2 years against any manufacturing or material defects. Any such defects will be repaired or replaced at the discretion of ALM. This does not apply to;

- Physical damage arising from mistreating (i.e. dropping, submerging etc).
- Damage caused by incorrect power connections.
- Overexposure to heat or direct sunlight.
- Damage caused by inappropriate or mis-use.
- Use of incorrect or non official firmware

No responsibility is implied or accepted for harm to person or apparatus caused through operation of this product.

By using this product you agree to these terms.

Support

For the latest news, additional info, downloads and firmware updates please visit the ALM website at <http://busycircuits.com> and follow @busycircuits on twitter.

Please send any questions or comments to info@busycircuits.com

